GLEANINGS IN BEE CULTURE

A JOURNAL DEVOTED TO BEES AND HONEY AND HOME INTERESTS

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STRAY STRAWS FROM DR C. C. MILLER

SECTION CLEANERS are bound to come. That on p. 186 looks hopeful.

HURRAH FOR OMAHA! *if* the fare isn't more than to Cincinnati.

GRAVENHORST says for years he has successfully wintered reserve queens by putting two or three nuclei in one hive, as given in GLEANINGS, p. 132.

I DON'T WANT p. 175 read by any one in this region. I've had trouble enough already getting my honey packed; and if my packers should read p. 175 I'm afraid they'd want to veneer worse than ever.

THE WHOLE SECRET of getting sections without pop-holes, *Review* says, lies in having freest communication all round the section. Guess that's about what GLEANINGS has said. Likely right, but fully testing won't hurt.

IN EVIDENCE that the T super is simply intolerable, the editor refers to S. A. Niver, p. 81, where Niver says the only experience he ever had with T supers was in smashing some old ones! [Turn to Tilt's article on page 207. —ED.]

TALKING OF GRADING comb honey, Hutchinson says it's all right, when you've graded a case of fancy honey, "to select from *that case* of sections those that are the best, and put them next the glass." I'm looking with some interest to see this *Review* hastily reviewed in next *Review*.

L. A. ASPINWALL, in *Review*, says with ¼ in. space between and above top-bars, burr-combs will be built with insufficient storage room; that plain sections must be removed as soon as well filled, to prevent bulged edges; that less expensive cases will be used by him, as the no-drip feature doesn't fully work with plain sections.

A CORRESPONDENT of *Am. B. J.*, page 122, wants to know what became of part of the syrup he fed his bees. He gives careful weights, and finds that 5 colonies not fed lost 6⅔ lbs. average in 73 days from Sept. 27, while 10 colonies fed syrup lost 13 lbs. average. Isn't there always considerable loss whenever we feed bees?

"APPLY CASTOR OIL to the projecting ends of brood-frames, edges of closed-end frames, etc. . . . . When this is done the parts are always loose, and may be easily taken out or moved."—Ed. Jolley in *Am. B. K.* A valuable thing, if it doesn't turn out like paraffine, and I kind o' think it won't.

"THE TEXT-BOOK," the periodical publication, and practice, constitute the 'three graces.' And the greatest of these *is* practice," says *Am. B. K.*, very truly, and it hints that a man would be a fool to spend years in learning by practice what he can gain in a few hours by reading what others have learned from practice.

A WRITER in another journal says he likes to see me "sassed" in footnotes to Straws. I've long noticed, Mr. Editor, that you treated me with "too much flippancy," and now that others notice it I hope you'll be more respectful. [It is more fun to "sass" you than any one else. If you do not like my "too much flippancy," then "flip" back.—ED.]

THAT "SASSY" NIVER thought that that one section without pop-holes of Danzenbaker's was about the only one that ever lived. Hutchinson says he had a whole case of 'em at Buffalo, and he, H., ought to know, for he bought 'em, lugged 'em to all the fairs, and then sold 'em at 20 cents a pound, and there wasn't a pop-hole in the case. [Yes, Danzenbaker had several cases of them here in Medina, and they were not produced by him, either.—ED.]

"I FEEL SURE," says Editor Hutchinson, 'that, if the matter could now be put to vote, amalgamation would be carried unanimously. What is there to hinder such a vote being taken now?" I'll stand up to be counted with W. Z., if he'll put "almost" before unanimously, but I don't know the answer to his question. [There is nothing to hinder a vote being taken now, if I am correct, providing that ⅔ or at least a majority of the members of both organizations ask for such a vote.—ED.]

YOU WONDER, Mr. Editor, I didn't notice your getting your answer hind side afore about

bees on cellar bottom, p. 141. I did notice it, and started after you with a Straw, but I thought that was too light a weapon for so heavy an offense, and started a club by a later mail. [You need not club me, because I take it all back, doctor. The type did not let me say what I wanted to. My tongue has a fashion of telling things t'other side to; and the worst part of it is, the shorthand notes take me for what I *say* and not for what I mean.—ED.]

SPACING-STAPLES are used in Germany with one leg ⅔ as long, and cut square off. They've been advertised so much and so long that I suppose they must be considered better. I wonder why. Possibly because there's less danger they'll be pushed in deeper when in the hive. [I should not be surprised if that short-legged staple would be a good thing. The object of having one leg shorter, and cut square off, is, I presume, as you suggest, that there may be less danger of their being pushed deeper into the wood when pressure is exerted on them *en masse*.—ED.]

THE EDITOR wants me to hit Mr. Neece, p. 183. Nary a hit. Mr. N. is not the kind I'm hitting. It's the fellows who sell 15 oz. for a pound. A section so light it can't go for a pound is all right. And I've a very kind feeling toward a section as thin as bees left to their own sweet wills would build. [You mix me all up, doctor. You have just ordered 15,000 sections 1⅞ wide, old style. Now, 1⅞ will not hold a pound, but will run from 14 to 15 ounces. To make your preaching and practice coincide, you either ought to use 2-inch sections or else those 1½ or 1⅜ wide.—ED.]

SAY, MR. EDITOR, on p. 182 you tell W. B. Ranson a 5x4¼ section would have to be so "thin as to render old section-holders useless." Why, bless your heart! what does he care for your "old section-holders"? He's a T-super man! You didn't mean to be so unfair, did you? [I shall have to acknowledge the corn. I had forgotten the fact, temporarily, that he was a T-super man. But how about the real point, that a 5x4¼ section would be too thin? There is such a thing as a nice golden mean; but too much of a good thing is sometimes bad. Either a 5x4¼ section would have to hold more than a pound, or else be so thin that it would topple over with the least suggestion.—ED.]

DOOLITTLE is emphatic that field-bees give their honey to nurse-bees, the latter storing it in cells. J. A. Golden says in *Review* that he has spent much time watching his bees, and, when furnished a proper passageway, the great mass of his field bees make straight for the supers. Can't these brethren come to some kind of understanding so that we can continue to believe both? [Now, doctor, you did not tell us what *you* thought about it; and for fear you may throw the same insinuation in my face, I will venture a guess that they do both ways. If they are both honest and accurate in their observation, then it is fair to suppose that bees follow no invariable rule in the matter.—ED.]

CLEATS ON FENCE are said to be two-twelfths inch thick. I'm puzzled to know why one-sixth wouldn't do as well. [Yes, $\frac{1}{6}$ does seem more reasonable; but when we take the dimensions in the fence we have to deal with $\frac{1}{12}$, $\frac{2}{12}$, and $\frac{3}{12}$. It is easier to see that $\frac{3}{12}$ is ⅔ of $\frac{3}{12}$ than that $\frac{1}{6}$ bears the same proportion to ¼. In the Canadian journals I know it seems to be the rule to talk in $\frac{1}{16}$ths, $\frac{1}{32}$ds, or $\frac{1}{100}$ths. If, for instance, they are talking in $\frac{1}{16}$ths, the same denominator is carried clear through, and only the numerator is changed; that is, they have the same noun, but change the adjective. For instance, a certain thing is $\frac{7}{16}$ths one way, and $\frac{8}{16}$ths another.—ED.]

THAT STICKER, p. 170. Wouldn't less reading be more sure of attention? Might amend in this way:

Handle with extra care.
No Hand-trucks.
Set down easy.
Haul only on Springs.

If they are set down easy, they'll hardly dump or drop. The finger ought to point to bow or locomotive, but hardly to horse, unless the horse walks beside wagon. [Your idea of less reading is just right; but as to whether the finger should point to the horse or not, some say one way and some another. Let us have a show of hands.—ED.]

HASTY'S been trying different diets for "bodily and mental off-the-track-ness." One of the last reported was a daily ration of 12 oz. candied honey to 10 oz. granola and crackers and a cup of milk. He says he's going to try some more things. I hope not too many. I like Hasty, and should miss him. [If Hasty can stand ¾ lb. of honey at a meal, for three meals a day, day after day, he can stand more sweet or more honey than any other person I have yet come across. The editor of the *Busy Bee* tells about eating lots of honey; but I do not think he ever stated just how much he could take care of at a ration day after day.—ED.]

THE *Busy Bee* man disagrees with GLEANINGS. He says locality and season have nothing to do with it; he's eaten sweet-clover honey from all parts of the country, from New York to Utah, gathered at all seasons when sweet-clover blooms, "and it is always the same—just as fine as it can be." I got a 60-lb. can that Editor York thought finest in quality. I didn't think it remarkably fine, and others thought it disagreeable. I've sampled other that I thought delicious, but it may not have been true to name. The quality of sweet-clover honey seems as yet an indeterminate quantity. [My notion of sweet-clover honey is the same as Dr. Miller's.—ED.]

SEEMS HARD to stop an erroneous statement once it gets started. Nov. 15, it was said in GLEANINGS that an old-style separator "after being used a year had to be discarded," and that the fence was good for years, when any one who has had good old-style separators ought to know that they are also "good for years." Yet here comes, three months later, the same error, slightly modified, in *American B. J.*, "the old-style separator, which, after

being used a year or so, had to be discarded." With a friendly feeling to the new separator, I don't want to see that slander on the old one perpetuated. [Now look here, doctor, you once told me that your wood separators used to make the best kind of kindling, and that you did not care to use them more than one season; that it was cheaper to buy new ones than to clean the old ones or to take the naughty kinks out of them. You must have flopped over since the advent of that naughty canard.—ED.]

ONE-FOURTH INCH space between thick top-bars allows more brace-combs than I like. I'd give something to know whether it would be any improvement to have more or less than ¼. [It may be that it would be much better to use $\frac{3}{16}$ inch rather than $\frac{3}{12}$; that is to say, ⅔ of a bee-space rather than a whole one. I know bees can pass freely through a $\frac{3}{16}$ space, for I have been trying it this warm balmy day, the 7th. We placed two cleats on the hive that are $\frac{3}{16}$ inch thick. Between the cleats were several bees crawling. On the cleats we laid a plain sheet of glass. The bees passed very readily back and forth under the glass, although they did not stand up quite so high. They had to "scrooch down" just a little. The average bee, when walking full height, stands about $\frac{3}{16}$ inch high. Now, the question is, would bees put bits of propolis and wax between the top-bars if they were spaced just wide enough for them to pass between?—ED.]

WELL, MR. EDITOR, you *are* exasperating for sure. When I ask for particulars about "getting section honey from two-story hives," you refer me to p. 141, where you give just seven lines, and say you don't take away brood. Talk about insult! B-r-r-r! How did the amount of comb honey from the two-story ones compare with that from one-stories that didn't swarm? How much per colony? How much brood was kept in the two-stories? How many of 'em swarmed? Did you start in spring with two-stories, or when did you give the second? Just before the queen commenced laying in the unoccupied story, was it above or below? Did you use any means to induce the queen to make a start in the other story? I'd give a pile to be able to run two-stories throughout the season; and if you've got the combination, squeal. [Well, doctor, you are exasperating for sure. You have thrown at me such a maze of questions that I shall have to take time to go over the ground carefully a little later on. Now, if I forget it before the honey season next year, just point me to this Straw. I will say right now that I do not know that I have got the "combination;" and perhaps before I can answer all of your questions I may have to go over the thing again in practice to know exactly how I did do last summer.—ED.]

"TO USE *past* for *passed*, and *must* for *mussed* destroys many a fine shade of meaning," quoth ye editor, p. 166. Try it on Leland. Say to him, "From the way your hair is must, you must have past a sleepless night the past night," and then see how much better he'll get the fine shade of meaning if you say, "From the way your hair is mussed, you must have passed a sleepless night, the past night." If that doesn't illustrate it properly, try your hand at an illustration. [I have not consulted Leland yet. Indeed, he is hardly old enough to perceive the difference in the two readings, even if there were quite a difference. But to my notion the first sentence reads rather queerly. As I read over the words "is must," the thought struck me instantly whether *is* had got into the place of *must*, or *must* in the place of *is*. But if even half of the printers and publishers would flop over, I guarantee you I could adapt myself to the change.—ED.] [But the way of spelling a word has reference only to the reader, who is supposed to read to himself. If he reads, "She is an old queen," or, "She is an old quean," the effect is "allee samee" to the listener; but the legal meaning can be determined only by the spelling; and these differences in spelling you propose to obliterate. A law that was *past* last August had become obsolete as long ago as that time; but a law that was *passed* then went into force at that date, and may still be in force. These nice distinctions would be *mist* (missed) if the new spelling were adopted.—PROOF-READER.]

MORE ABOUT YIELDS OF COMB VERSUS EXTRACTED.

Wax Secretion, etc.

BY R. C. AIKIN.

Some will gather from the previous article that the slow flow, in which the colony will be slow to build comb, is an argument proving that ready-made combs would get a crop of surplus when sections with starters would not. Not so. The great majority of flows are of short duration, I think usually not exceeding three to six weeks. A 30-days' flow at 2 lbs. per day would give a total of 60 lbs., which, when ripened, would be only 35 to 40 lbs., about what is necessary to fill a ten-frame brood-chamber. Since, then, most flows are of short duration, we more frequently have to do with flows of limited time, though free enough while it lasts, and, when it lasts long enough to give a yield sufficient to give surplus, there comes with it wax secretion sufficient to build comb to hold it.

Don't lose sight of the fact that weak colonies can gather only in proportion to their numbers. A colony that can barely spare from the brood-nest enough bees to work but 10 to 20 sections at a time could not put up

more than a brood-chamberful of honey in a 30-days' flow, yielding, for a good colony, 2 lbs. of nectar per day. If such a colony had the ready-made surplus combs you could get quite a lot of honey in them, it is true, but at a sacrifice of winter stores, and of the colony in the end. Take, as an illustration, the two colonies used as scale colonies in 1897. That was a year in which my general average surplus was 45 pounds, the stock as a whole being in about average condition of strength, etc., when the flow was on. Scale colony No. 1 was not quite an average one; and during the main part of the flow they were contracted to a very small brood-chamber — about five L. frames capacity. I took from this about 50 lbs. of surplus in sections, leaving, I think, not over 20 lbs. of stores, probably less. Their total gain was about 88 lbs. during the flow proper — a little being gathered outside the record dates. This colony's average daily gain was $1\frac{3}{5}$ lbs. in a 55 days' flow, or, rather, two flows of 30 and 25 days respectively, divided by about two weeks in which a very trifle over their living was obtained.

Colony 2 was better than the average, had a nine-L.-frame brood-chamber throughout the season; made a daily average of a trifle over 2 lbs. gain; gave 75 lbs. of section honey, and probably 25 lbs. of stores. This colony did not show as much shrinkage as the other — that is, gave a greater yield of *honey* in proportion to the gross gain in nectar; but I attribute this to a quicker ripening, because the colony was much stronger; hence the greater evaporation during the day between morning and evening weighings would account for the discrepancy.

This season of 1897 was very close to an average one as to condition of colonies and amount of surplus; but the strength or freeness of flow was rather weak, and its duration somewhat extended. While both of my scale colonies were managed for comb honey, it is a significant fact that my average yield of extracted was just about the same as my comb-honey average, though I think the extracted-honey colonies have a little the advantage in the amount of stores on hand. Knowing the tendency of the extracted stock to store in the super combs at the expense of winter stores, I gave them larger brood-chambers to insure sufficient stores.

It appears, then, from the foregoing, that in this average season I was able to take just about as much of section as extracted honey, but it was done with colonies that did not swarm. I said my stock was in average strength, but I suspect my standard of strength is above that of the average apiarist. They were in very fair condition at the opening of the flow, all increase made carefully by division, and at the rate of about two new ones to three old ones. A few of the weaker colonies gave no surplus at all, some of the best giving almost (a very few quite) 100 lbs.

It appears, then, that the colony of only fair to average strength will not usually gather more than necessary stores during an ordinary flow; while if the daily gains reach $2\frac{1}{2}$ or more pounds they will take to comb-building. An average daily gain of 4 lbs. will give a net gain in honey of about 75 lbs. in a 30-days' flow, and will cause any *ordinary* colony to secrete wax and build comb freely. If, however, the average colony can not gain at least 2 lbs. a day of raw nectar, we should not expect any surplus of either comb or extracted unless the flow exceed 30 days' duration. Such a rate of gain, long continued, will induce wax secretion and comb building, and average to strong colonies will build comb and store in sections after brood-combs are filled, if swarming does not occur.

My understanding of California honey-flows is that, as a rule, they are slow but steady. If this is true, I should say that the average apiarist there would get a greater yield of extracted than of comb, because, to have comb built, requires a reasonably free flow or very strong colonies. For years I have maintained that the ratio of yield, as between the two products, comb and extracted, has been greatly overestimated in favor of the extracted, though at no time have I claimed that the extracted did not lead a little.

There are three conditions under which the yield of extracted may exceed that of comb by quite a little, one of which appears in the foregoing paragraph. Another condition is one in which it is so cool that comb can not be built successfully, and yet a free secretion of nectar, and weather such that the bees can bring it in. The third condition is a very *abrupt* and *profuse* flow.

The second condition I think rarely exists, though it was claimed at the Lincoln convention in 1896 that such was the case frequently in Nebraska. I think a little protection and strong colonies would overcome most of that difficulty. If such conditions came about when a colony was well provided with old or field bees, and no *young* or comb-builders, I can see that the difference would be quite marked. This would be much more likely to occur in a very late flow than in an early or midsummer flow.

The difficulty about an abrupt or profuse flow is that, coming on so suddenly, every thing may be filled to overflowing before wax secretion gets under way. The principal loss in such case is in the interim between filling the ready-made comb and getting wax secretion and comb-building started. I have had one case of that kind in eight years, and not over two in over twenty years. The case eight years ago was one in which the change was so rapid that, from a condition in which old stores were being rapidly used for support of brood-rearing, four days' time filled all empty comb, including a number of bait-combs in supers. Only these very abrupt changes from no flow at all to a free one can have much weight under this head.

The argument about the quantities of honey consumed in wax secretion, and the labor of building comb, I consider of very little weight. I need not prove that the secretion is an involuntary act on the part of the bee, in order to sustain my position. The fact that much wax is secreted when not needed is sufficient evidence to show that that factor does not

count much outside the conditions hereinbefore mentioned. I once received a shipment of bees by express; and while there was no necessity for the comb-building act they did build comb in their cages, and were loaded with wax, and had it plastered in many places, evidently just to get rid of it. I have also observed much wax go to waste many times in regular normal colonies. I believe that a flow of nectar or handling of honey is always accompanied by more or less wax secretion. It is an involuntary act, or else voluntary, but without foresight or reason to regulate it. Perhaps conditions lead them instinctively to secrete, or it may be wholly involuntary.

SCALE-COLONY VARIATIONS—SOME REASONS.

For several years I have suspected that one scale colony was not a true index. So believing led me to desire to have either a number of colonies on one big scale, or as many each on a separate scale. The nearest I have been able to accomplish my desire was last season when I kept two colonies on two scales, and more scales would have been used could I have had them. Some things were noted that, at least to me, were very interesting.

Colony one was in a hive about 15x17 inches square, inside measure, 9 inches deep, a divisible brood-chamber. The brood-frames were 4¼ deep by 17 long. When the flow came on, this colony had not yet built up strong enough to use a super, especially in the moderate flow prevailing. They worked with great vigor. From June 6 to June 12 they gained 3 lbs.; the 13th and 14th, 1½ lbs. each; and the 15th, 2½. Colony 2 was a much stronger one, and stood right beside No. 1, yet their gain exactly tallied with No. 1 up to the 15th, when it was only 1½ instead of 2½, as was No. 1.

The 16th and 17th, heavy west and northwest winds prevailed; and although clear, and maintaining about the average temperature as the preceding days, nothing was gained by either colony. On the 16th both colonies had queen-cells, which I removed. The 18th they gained 2½ and 4 lbs.; the 19th, 5 each; the 20th, 5½ and 6½; the 21st, 2 and 2½—rain coming in the afternoon. Also again cut cells from No. 1. The 22d it was 3 and 5. Notice that colony No. 1 was equal to No. 2, although much the weaker, up to the 15th, when it had 2½ against No. 2, 1½. On the 23d I manipulated No. 2 and lost their record for that day, while No. 1 gained 3 lbs. and cast a swarm about noon, which returned, having a clipped queen. The 24th showed 1 and 1½ as the gains.

On the 25th the gains were 0 and 1½. From colony No. 1 I removed all brood, and all comb except 2 of those 4¼x17 frames, contracted to one shallow chamber with starters in the other 8 frames, and put a super on over an excluder, hoping thereby to stop their sulking and swarming notions. I also unqueened No. 2, which had no cells started. Right here is something that interested me much. Colony 2, although unqueened, made, the following days, gains of 4, 7, 7, 6, 6, 3½, 3, consecutive days, the best week's work done by either colony throughout the season. Colony 1 made for the same days 1, 2½, 1½, 1, 1, 1½, and 1½.

Three days after removing brood from colony No. 1 I could find neither queen nor eggs, so I ran in at the entrance a laying queen, which the next day I found balled; also found the old queen and removed both, leaving them queenless and broodless for a day, when a laying queen was accepted at the entrance. This queen soon had brood started, and from this time on the work of the two colonies was about equal to the end of the season. While the most of the time the daily gains were very nearly equal, there would be a day occasionally when one or the other would show a marked variation.

During this latter part of the season when they were working together, the most of the time showing like gains, each had its laying queen and plenty of room. Why it was, that for a day one should go beyond or fall behind the general record I am not able to explain. It proves, however, that a single colony is no true index, and that there are many and complicated influences to contend with. I hope, another season, to follow up the study in a more thorough manner.

Loveland, Col.

FACING HONEY.

Marking Cases Heavier than they are; Section-holder Arrangement Ahead of the T Super; Rate of Section cleaning; Fence and the Width of Cleats.

BY I. S. TILT.

I do not know to what extent the facing of honey is practiced as stated in GLEANINGS, page 83, by Mr. Aaron Snyder; but I do know that it is the case to some extent, at least, and that by producers too. I buy quite a lot of honey each year, and I have often noticed that it seems to be comparatively easy for some people to do this wrong act. I always make it a rule to examine, and grade roughly before buying, so as not to get "left." When I grade honey I try to put a good average comb to the glass. I have had only one complaint about honey not being as I represented it. The man wrote me, asking what he should do with it when he received it. I have been told that this man makes a practice of playing sharp. I presume he thought that I had no other place to dispose of it, and would be compelled to sell it to him cheaper than he had bargained for it. It is needless to say that I did not gratify his desire. The man I sold it to afterward thought it was the prettiest he had ever seen.

Another evil that often crops out is that of marking the case heavier than it actually is, so as to get pay for more pounds. I noticed a case of this kind in Detroit last fall at a retail

grocery that I visited. The case was marked 2 lbs. heavier than it actually weighed. I do not know whether the commission man or the producer was to blame for this; but I rather believe it was the latter.

It is rather queer that men should vary so greatly in their opinions, as is the case with Dr. Miller and Mr. Niver in regard to the T super. I have used both the T super and section-holders; and as I used the former before I knew any thing about the latter it seems that I ought to be accustomed to the T super, and I prefer to use it, just the same as Dr. Miller has done; but as soon as I gave the section-holders a trial I quickly decided in favor of them. I suppose it would not do for us to all think alike, because, if we did, new things would not be invented very soon. If we all thought alike we should be like the Indian who said that, if all men were of the same opinion, they would all want his squaw for a wife. But say, doctor, had you not better throw up the sponge and confess to E. R. Root that the section-holder arrangement is best?

That is pretty big work mentioned in a Straw on page 80 of GLEANINGS, where the women could clean 1200 sections in a day. I confess I am capable of cleaning only about 150 in a day. But there may be some difference in the sections as to the amount of propolis, and probably I take more pains with them than I need to.

I think that Mrs. Axtell's 1500 sections cleaned in a day by 20 women would be a little nearer what most people could do, and do it right. To be sure, we shall have to make some allowance for talk when that number of women are together. As I am obliged to hire some help to clean sections I should like to ask Dr. Miller confidentially whether that woman is single or married.

There is one point about the fence separator that I can not see into. I have never used them, but it seems to me there must be a mistake in its construction. I refer to the cleats across the fence. For instance, the three center cleats are ½ inch wide, as made by The A. I. Root Co.; and as the two sections coming in contact with the cleats are only ¼ in. thick, there would be ⅛ inch projecting past the edge of the section on each side. Now, I do not see how the bees can finish the comb under these cleats level with the rest of the comb. I will try to explain more fully what I mean. The cleats on the fence are $\frac{2}{1\frac{1}{2}}$ inch thick, which would let the comb retreat $\frac{1}{1\frac{1}{2}}$ from the edge of the section, as I find by measurements that ¼ is the space a bee requires to work in. Now, the way I see it, this space, namely, $\frac{1}{1\frac{1}{2}} \times \frac{1}{8}$ inch, is not large enough for the bees to get their heads into to finish it level, and consequently they will have to leave a furrow or attach the comb to the separator-cleat. Why not have the center cleats on the fence just the width of the two uprights of the sections—namely, ¼ inch wide? As my ideas in regard to the fence are only theory, I should like if some one would explain this point from actual practice.

Filion, Mich., Feb. 7.

[I "smoled" another big smile when I read what you say about the comparative merits of the T super and section-holder arrangement. Dr. Miller, encouraged by the friends of the T super, in a recent letter, finally made bold to fling this question into my face: "I do not remember to have seen mention of many cases in which section-holders were preferred by those who had had considerable experience with T supers. Do you know of one case?" That last sentence rang in my ears. "Yes," I said, "I know we have had lots of them." Turning to Mr. Calvert, who sat near, I put to him the same question. Said he, "We have had *hundreds* of them." My other brother-in-law (the newly made one), Mr. Boyden, whom I approached in a like manner, and who did not know Mr. C.'s answer, gave practically the same answer; but not one of us could remember a specific case. After writing to Dr. Miller to that effect, then came along this article of Mr. Tilt's; and I presume I should not have remembered even this had not the doctor fired that "one case" at me.

I should really like a show of hands from those who have tried the two arrangements. Be sure to give your exact preference, without trying to favor the prejudice or opinion of the editor, nor of that other editor, Dr. Miller.

As to your question regarding the fences and the width of the cross-cleats, we debated that question for a considerable time. One class, among whom was Mr. Danzenbaker, urged making the cleats only ¼ inch wide; another class, among whom was Miles Morton, and his brother-in-law Niver, insisted that ¾ inch was nearer right. We finally compromised by adopting ½ inch, because in practice there is more or less end play, and it is desirable to have the edge of the section entirely covered.

So you do not see how it is that the bee can make the face of the comb level clear out to the uprights of the sections. Neither can I. If the cross-cleats are ¾ inch, the face of the comb will take a dip under the cleats. If it is only ½ inch, it will take a dip under, but only about ⅛ inch from the upright of the section. One object of this is to make it easier to cut out the comb with a caseknife.—ED.]

NOTES OF TRAVEL AMONG BEE-KEEPERS OF YORK STATE.

Coggshall's Method of Extracting; his Kind of Extractor; Preparing the Combs for Winter.

BY E. R. ROOT.

In our last issue I told you something of Mr. Coggshall's method of opening hives, taking out the combs, and carrying them to the extracting-house. I have already stated that the building or structure that he uses at all of his out-yards is a cheaply built affair, and is not made with any reference to being bee-tight.

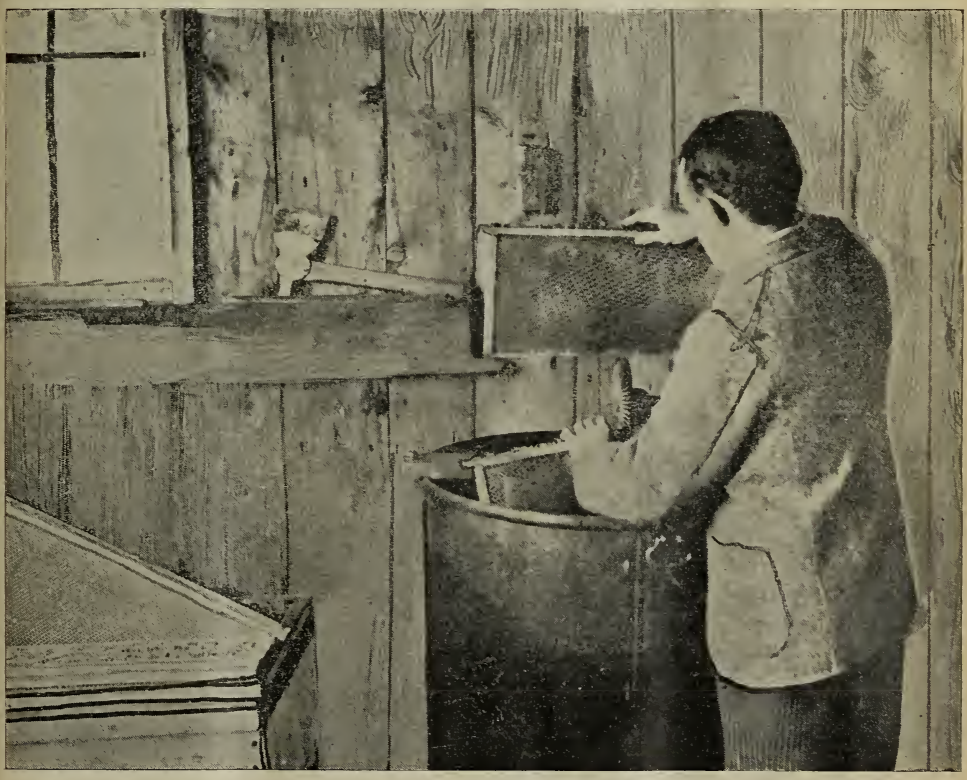
As soon as the hand-cart was loaded it was drawn to the honey-house and the supers of combs were piled up one on top of the other.

As was to be expected, robbers were flying all through the building, nosing into every thing, especially into combs, and about every minute one would strike the reel revolving in the extractor, and then be thrown by centrifugal force against the side of the can. These, together with the robbers already on the combs, rattled against the sides of the can as they were thrown out with the honey. Of course, the surface of the honey in the extractor was covered with dead or struggling bees, and these extended to the depth of an inch or more into the honey.

I asked Mr. Coggshall if he used any strainer. "Don't need any," said he. As the bees were taken out and "dumped" to be cleaned by the bees.

Mr. Coggshall probably loses, I should say, anywhere from a quart to a peck of bees at each extracting. But that does not matter. "Why," said he, "I can raise bees for fifty cents a colony; and the cost of trying to save those few bees by constructing a bee-proof building, and working slowly and carefully enough to avoid robbers, would amount to a good many times more than the value of the bees."

Mr. C. makes use of a four-frame non-reversible extractor of his own get-up. The Langstroth frames, instead of being put down *end-*



COGGSHALL'S EXTRACTOR AND THE METHOD OF INSERTING COMBS.

were lighter than the honey, they would float; and when the honey (and swimming bees) reached almost to the reel of the extractor the operator stopped a moment, placed a pail under the extractor-gate, and drew it down pailful by pailful, and emptied into the half-barrel. I watched very carefully, but I could not see a single dead bee in the honey so drawn off. After a day's extracting, or perhaps half a day's, there would be from two to four inches of dead bees in the honey. The liquid portion is drawn off through the honey-gate below, and the dead bees—well, I don't just remember what was done with them; but I think that, after they got through extracting, they

wise, are set into the machine just as they hang in the hives; and instead of putting combs into a reel, one on each of the four sides, the combs are placed in the machine in pairs, the two pairs being opposite, and each comb of a pair separated off by a sheet of tin as large as the comb. This, of necessity, places two combs nearer the center of the reel than the other two. I told Mr. Coggshall it seemed to me that the outer ones would be better extracted.

"Well, see if you can see the difference;" and although I looked over quite a number, the combs seemed to be about all equally well extracted.

COGGSHALL'S EXTRACTING SUPERS; SCRAPING OFF THE BURR-COMBS.

"But is it not true," I said, "that the end of the combs, being further away from the center, are extracted cleaner than those in the center?"

Again I was requested to look over the combs once more; and, greatly to my surprise, there was no difference that I could detect.

"There are a good many things that are plausible in theory," said Mr. Coggshall; "but here is a case where theory and practice are decidedly at variance."

"But why do you want to put the combs into your extractor just as they are in the hive? It necessarily takes a bigger machine," I said.

"You watch the boys extract," said Mr. Coggshall.

The man who was operating the machine would pass his forefinger between a pair of combs in one of the supers, grasping them along about the center of the top-bar. On removing these he would grab another pair in the same place with the other hand. The first pair would then be set down on one side of the reel, one on each side of the tin partition referred to. The other handful was set down on the other side. The machine was then given a few vigorous turns, and the honey fairly rained against the sides of the can and the tin partition between the two pairs of combs.

"Now," said I, "if you had a reversible extractor you would save time. You have got to go to the fuss and bother of picking up these combs by hand, and turning them around t'other side to."

"Just watch," said he.

The operator pulled both sets of combs out of the extractor, using one hand for each pair, or, when it was more convenient, one comb to the hand. Instead of turning the combs around t'other side to, they were kept in the same relative position, and made to trade places. Just how this is accomplished is set forth more plainly in the engraving shown herewith. You will notice that one comb (or two, as the case may be) takes a jump over the other, so that the *same side* is kept toward the operator all the time. When the combs are regular, and but few burr-combs, they are picked up in pairs, and transposed in pairs, so that, while the extractor is not reversible, it secures results almost as rapid as the reversible machine. Mr. Coggshall thinks it even more rapid; but I can see how an extractor can be made on this principle, and be reversible. The cost of the machine might be a little more; but the time saved in "jumping the combs" would be considerably economized.

Mr. Coggshall is very certain that he wanted the combs to hang in the extractor just as they hang in the hive. Said he, "In the case of the ordinary extractor it is necessary to take the combs out of the super by the top-bar with one hand. The other then takes hold at the end-bar, after which it is set down into the extractor. As soon as the combs are extracted, the same operation is gone through with again, only the method is reversed. By my plan I pick the comb up by the middle of the top-bar and set it into the machine, *without changing the grip*. This allows me to pick up four combs at a time, two in each hand. By the other plan *one hand must assist the other* to get the comb in position so it can be inserted in the extractor."

I must acknowledge, although I do not want to, that there is a good deal of logic and good sense in what Mr. Coggshall has to say; but before I would be willing to give up that he can work faster than ordinary bee-keepers can with the ordinary reversible machines, I should like to see a trial test made.

Well, after the combs are extracted they are set back into the hive-supers, and stacked up in the extracting-house, as shown in the large cut — that is, providing this is the last extracting; if not, they are set back on the hives. At the time I visited the yard it was at the time of the last extracting in the season, and the supers were piled up as shown. Of course, the combs mere wet with honey. But that made no difference. When the men are gone, the bees are allowed to have their own sweet will—that is to say, they crawl through those cracks and crevices in the building, make their way to the combs, fill themselves up, and make for home. Of course, it necessarily makes an uproar of robbers; but that makes no difference, for the yard is a good way from any human habitation, and the bees simply have *a glorious old spree in cleaning things up*.

The illustration shows the method of cleaning the burr-combs off at the end of the season after the combs have been cleaned by the bees. Two forms of scrapers were used, and the method of use is explained by the illustration.

Mr. Coggshall uses thin top-bars, I think principally because he has thousands and thousands of such combs, and can not afford to make the change. Then I am rather of the opinion that he believes burr-combs make "ladders" from one super to another. At the end of every season, boys go around and go through the operation shown in the engraving.

The marketing kegs and barrels are shown on the left. They are made of cypress, and for the York State market they are just the thing.

PLAIN SECTIONS AND FENCES.

Doolittle's Criticisms; Counting the Cost.

BY G. M. DOOLITTLE.

Question.—I have 100 colonies and surplus arrangements, using wide frames to accommodate them. Would you advise me to throw these one side and adopt the plain sections and fences spoken about so much of late in GLEANINGS?

Answer.—I have read with great interest what has been said during the late past, regarding the plain sections and fences, but must say that, so far, I have failed to see any *good substantial* reasons why *all* bee-keepers should adopt them, but, on the contrary, I think I do see good reasons why all bee-keepers, who have every thing arranged for securing

surplus honey with the old-style sections and separators, should keep on in the "even tenor of their ways." First among these reasons is, the cost required for such change. After making a careful estimate, I am confident it would cost me fully $100 to make such a change for my apiary, and I should have to think some time, and also carefully try the plain sections on from two to five colonies, before I would consent to harbor the idea of making such a change. It is estimated that there are 400,000 bee-keepers in North America, and to give a little idea of what the cost would be, were *all* to make this change, I have figured it this way: We will allow that three-fourths of this 400,000 either use the plain sections, or are not up with the times, and these latter would not adopt any of the modern improvements of any kind. This would give us 100,000 bee-keepers who *should* adopt the plain sections, if it is advisable for any one to do so. Now, to be under the cost, instead of over it, we will allow that the average cost would be only $10 to each of these 100,000, instead of the $100 I estimate it would cost me. At this very conservative estimate, the cost would be $1,000,000 to the bee-keepers of the land. Does any one see where enough gain could be made to compensate for such an expense? I confess, I do not. If we are to change to every thing which has a boom, as the plain sections are having now, we shall be like a bee-keeper I know of, about whose apiary are piles of cast-off stuff, piled away in fence-corners and out-of-the-way places. These things, which cost him hundreds of dollars, are going to decay, and are a dead loss; but he keeps on changing and changing, while his family goes poorly fed and clothed, that he may keep up with every new (?) fad that comes along. Then who is to be benefited by a change from the old style section to the plain section and fences? It is represented that it is to be the bee-keeper. Will some one tell us how? when? where? and in what? Give us the proof and we shall be satisfied. "Well, the section will be filled fuller," says one. For the time being, I will admit this to be so, although I doubt it, where the right management is adopted. But if they *are* filled fuller, is this a benefit? Which sells the most readily in market—the full, heavy sections, or the lighter ones? Perhaps it may ease Dr. Miller's conscience a little to fix the retailers so they will have no 14-ounce sections to sell by the piece when they bought them by the pound; but Dr. Miller, and every one else who has had any experience along this line, knows that the lighter sections sell for the higher price. As proof I will say that, last fall, I assorted my sections as to weight, making certain cases, of 20 sections each, weigh 19, 20, and 21 pounds respectively. The result was, when returns came in, that those cases weighing the 19 pounds sold so as to net me a trifle over one cent a pound more than did those weighing the 20 pounds, while those cases weighing 21 pounds brought me a trifle less than 1½ cents per pound than the 20-lb. case. Hence the lighter sections brought me about 2½ cents more per pound than did the fullest ones; and yet I am told that it is to my advantage to adopt these plain sections because the bees fill them fuller, leave no peep-holes, etc. "But," says another, "they look better." Again I ask, when? where? and to whom? "To the producer," says one. Admitted, providing said producer is infatuated with *plain sections;* but if not, he considers that his old-style sections look the best. I showed the "frontispiece" in the January *Review* to Mrs. D., in which were pictured four plain sections, and four of the old style (she not being familiar with the discussion going on of late), and asked her which of the eight she would choose, to set before the choicest company she might chance to have, and she immediately chose one of the old-style sections which Mr. Hutchinson would have us believe was not as nice as the new style. When asked why she chose that one instead of those having no peep-holes, and which had the honey coming to the wood all around the section, she said that, with the no peep-hole in the sections, the honey would be set to dripping in cutting out, which would make the cake of nice comb honey less inviting by the time the company got to the table; that it was much more work to properly cut such a comb from the section, and, unless very careful in disposing of the section, honey would be daubed over things generally, from the dripping that would be necessary where honey was placed by the bees next the wood all around the section. Besides, there would be considerable time wasted in scraping all the honey off the wood to the section, or else quite a waste of honey, if not scraped off. To all of which I could respond a hearty amen, after having cut the honey out of many a section.

I claim, and have always claimed, that there is no handsomer-looking section of honey than the one whose comb is built out plump and nice, with a border row of empty cells completely around it. And I also claim, under the present wants of the public generally, such a section of honey is more profitable to the producer (from its selling price), and more acceptable to the consumer for reasons given above.

"But does not friend Niver sell these plain sections for a greater price than he does the old style?" I presume he does; but let me whisper that *Niver is a salesman;* and were it the plain section which had always been in use, and the old style that Niver had just become infatuated with, he could find more points in the latter to urge in its favor to customers than he now finds for his plain sections; hence he would sell the old style for the better money. Therefore, when told that the plain sections sell better, I always ask, "Who says so?" Does the price obtained in open market, without any pushing of this style above the old style, say so? Until it does, the claim falls to the ground.

"But," another says, "the plain section is an advanced step." Again I ask, wherein? Do you see those cells all along the tops of some of the sections whose capping has been pressed down so it touches the honey, or have

had their capping broken till the honey is oozing out and running down over the nice face of the comb? Is it an advanced step which causes us to use every precaution in handling our sections after they are filled, if we would avoid marring the faces of the pretty combs, either by our fingers or hitting one section against another, and that obliges us to put separators into our shipping-cases lest the sections slip by each other *just a little bit*, thus setting the honey to running? It seems to me that, the more such advanced (?) steps we take, the worse we are off. I can not think that the advocates of these plain sections have fully looked into the matter in all its bearings, or they would have seen some of these defects and told us about them.

In closing, let me advise those who are contemplating going into plain sections, or, in fact, any thing else they have never tried, to go *slow*. Never go into any new thing (*to you*), except on a small scale, trying it on a hive or two at first; then if it proves *good* in your hands gradually work up to where you can use it in the whole apiary. And should it prove against your wants and desires in your first trial, you will have expended but little, and can "throw it up" without cost, save what will be overbalanced by the knowledge gained by the experiment.

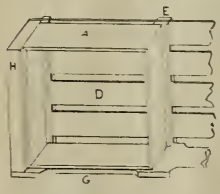
Borodino, N. Y.

[The article above should have appeared in our issue for March 1; but in some way it was misplaced after it reached here, and was not discovered until the journal had gone to press. After looking it over it seemed to me that Mr. Doolittle had shot clear over the mark, and therefore I wrote him, stating that I could not see *how* he figured that it would cost $1.00 per hive to change over to the fence and plain section; that we would agree to equip his supers with fences to fit his wide frames at a cost far below what he figured; namely, that we would furnish fences for his wide frames at $16.00 per 1000. We put the estimate high because his wide frames are odd-sized. We are furnishing fences for our section-holders, made to take the old-style bee-ways, at $10.00 per 1000. I further stated that it was not necessary for him to discard his wide frames. In reply he writes as follows:

I see you think I made a miscalculation as to the cost of changing from my present surplus arrangement to the "fence equipment." Perhaps so, yet I do not see it. You figure the cost of the fences at $16.00 per 1000. I figure that I use 25 wide frames to the hive, which, with tin separators, cost me 4 cts. each—$1.00 a hive—$100 for 100 hives. If I adopt the fence I must throw away these, hence throw away *cost* to the amount of $100, as the separators can not be used, nor can the wide frames (although you assume they can); for did I use the wide frames they would be too wide, so would give too heavy a section. Then, did I tear the separators from them and cut down the width ¼ inch, the work of doing so would be worth more than to buy new wide frames. Or do you claim that I should not figure the past cost? If so, then it would cost an established bee-keeper no more than it would a beginner, to start with the new equipment. If, as I claim, the fence arrangement is no better than what I am now using, should not the *cost* be counted as I have figured it, rather than on new fences?

About a less cost of shipping cases: We do not agree here either. When you come to take into consideration the warping of lumber and the carelessness of many in nailing, safe shipping of honey with the plain sections will necessitate separators for the shipping-cases; and these and their adjustment will more than make up the saving in lumber over the old style. I may be wrong, but this is the only way I can see it so far.

Friend Doolittle still fails to catch on to the fact that it is not necessary to discard old appliances to take the new plain sections and fences. The only thing that is cast aside is the old-style *separators;* and if they are of wood, as they are in the majority of cases, this last is nothing, comparatively speaking, as many of them would have to be replaced anyway. Mr. Doolittle figures 25 wide frames to the hive. This is allowing for pretty nearly 100 lbs. of comb honey per colony. He certainly put the figure high, and I do not believe the ordinary bee-keeper will secure more than 50 lbs. on the average, if he does that; and, besides, if he secured more he could use some of his wide frames over again. As he makes his wide frames the basis for 100,000 bee-keepers, I think it would be fair enough to cut down the amount to 50 lbs. per colony, or make 12 or 13 wide frames per hive. Well, say that we use 12 fences per hive. These would cost 20 cts.; if we figure on 25 wide frames the cost would be 40 cts. Now, let me assure Mr. Doolittle that this will be the total cost per hive, as I figure it, to equip his supers for plain sections, for he would not have to discard his old wide frames. Indeed, we will enter into contract to so equip his hives (on the basis of 25 wide frames) for 40 cts. per hive. Perhaps I can best show *why* the wide frames need not be discarded by showing the cut of how we equip our old-style section-holders for old-style sections. It is true, the plain section, as shown by the cut, is a little narrower than the section-holder; but this difference in width is taken up by the *cleats* on the fence. A careful scrutiny of the engraving will show, I think, how this is done. Perhaps I can explain it in another way by saying that the cleats on the fence simply take the place of the openings, or, rather, the extra width of the old-style sections. I think friend Doolittle will readily see that his wide frames do not need to be discarded at all, much less would he need to trim them down. But suppose he had to discard them, we would contract to furnish him enough for 100 hives, including tin separators, at a price of 2½ cents apiece, instead of 4 cts. as he figures it. The new wide frames and the new separators, all clean and nice, would be better than the old separators and wide frames by just about the difference in cost of nailing up.



In regard to shipping-cases, we will agree to furnish shipping-cases for plain sections, to hold a given number of pounds of honey, for less than we will furnish cases for the same weight of honey for slotted sections.

Speaking of prices reminds me that I talked with Mr. Niver on this very point. He sold both old-style section honey and Morton

honey. For the latter he could get better prices every time.

I have shown that picture we reproduced from the *Review* to a dozen or so persons—people who do not know a bee from a mud-wasp, much less the merits of the discussion that has been going on; and without an exception they have pronounced in favor of the plain section. But Mrs. Doolittle does make a point when she says the honey in the old-style section will cut out in some cases without dripping, when in the plain section the knife would cut through the honey. This may or may not have weight; but if it does I will guarantee that, by the change of the fence slightly, we can cause the honey to be filled out in the same way exactly, *if* it should be thought desirable; but the fact must not be forgotten that the honey in the plain section, as shown in the *Review*, would ship far better than that in the old style. The great problem for years back has been how to get the bees to secure their combs to the sections better. If I am any judge of what I have seen, the fence goes a long way in solving this problem.

Mr. Doolittle's closing caution, however, is a good one. I have reiterated the same thing in our own columns over and over again. I know of one bee-keeper, for instance, in York State who has changed his hives and his styles of goods almost every two or three years. He is too independent to follow in the wake of the supply-dealers, and has, therefore, made things to suit himself. He could show one piles and piles of stuff he has discarded for something he considers better; but he has never made the money that another man that I know of has—Mr. Coggshall, for instance—who uses all sorts of hives and frames. Almost "any old thing" is good enough for him. He numbers his colonies by the thousand, and his crops of honey by the hundreds of thousands of pounds; and his bank account—well, most men would feel independently well off.

But there is a golden mean in all things. When it comes to discarding hives we should go slow; but when, at a very slight expense per hive—say 10 or 15 cents—it *seems* as if we could get it back and more too then it is well for us to consider and test. I firmly believe that nothing in all beedom has yet been brought out that promises as good returns for the investment as the fence and plain section; for it is evident that plain sections will be and *must be* sold for less money than the slotted sections could ever be sold for. *For years bee-keepers have been squandering money for the bee-ways in their sections;* and if Mr. Doolittle would consider this one point, he would see that his big figures would in a year or so go clear on the other side of the column. Suppose next year plain sections are sold at 25 cts. less per 1000. One can readily see what a saving it would effect in time. Let's figure: If 100,000 bee-keepers, on the average, order 5000 sections, this would effect a saving of *one million two hundred thousand dollars per year.* Now, add to this the saving in the shipping-cases, the saving effected by the better shipping of combs built solid to the sections, and the figures would be enormous. But a long array of figures is misleading. Let's test the matter, each one for himself.—ED.]

DEEP VS. SHALLOW FRAME HIVES.

BY J. E. HAND.

While I am aware that the subject of deep vs. shallow frame hives is a much-mooted question, and while I do not wish to open a discussion on this subject, yet in an experience of six years with a frame 4¼ inches deep inside, side by side with deep frames, I have been forced to the conclusion (rather against my will) that very many of the points of superiority set forth by the advocates of the deep frame exist only in theory, and will not prove out when put to the test side by side in the apiary. Especially is this true of wintering. The deep-frame advocate will bring forth "bushels of theory," setting forth the superiority of the deep frame and the cubical form of hive which is so well adapted to the shape of the cluster, and gives so much better protection, etc. This has been harped on so much in the bee-journals, and looks so reasonable, that many have been led to follow this blind reasoning, to the detriment of their honey crop; and I must confess I have been one of this number. I considered it a calamity whenever I was obliged to winter a swarm in a single section of my hive, which contains eight frames, 4¼x17 inches of comb surface. It was so contrary to my preconceived ideas of what the shape of the brood-chamber should be to afford the best protection during winter; but, contrary to my expectation, these swarms invariably winter well, and after repeated success in wintering in these shallow hives I was forced to yield the point, and I intend hereafter to winter all my bees in these shallow hives, on summer stands, with winter-case packed with chaff.

I have no theory to bolster up these facts, nor do I wish any. Years of experience along these lines have led me to the conclusion that, all things being equal, it makes very little difference in wintering whether the brood-chamber is deep or shallow, round or square. The *difference* will be in the bee-keeper's pocket-book at the close of the honey-flow. It rests with every bee-keeper to decide for himself whether or not this difference is in favor of the deep or shallow frame.

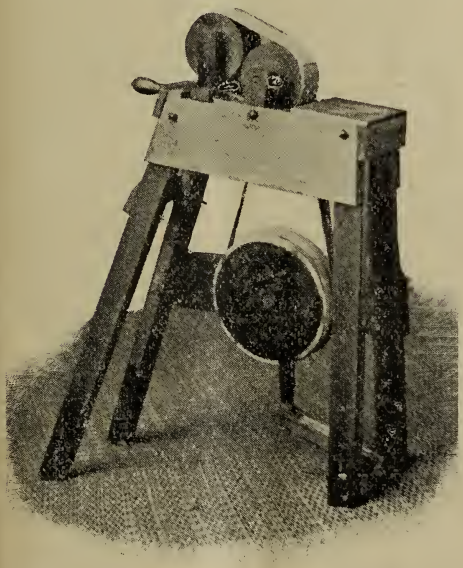
[The time was when it was thought that deep frames would winter bees better than the shallow; but in late years it is getting to be more and more apparent that, with the same management and same protection, one frame would give as good results as the other. I do not believe there is any one with any kind of frame who can show better results than we can with our Langstroth; and I see no reason why we could not obtain equally good results, even if we were using frames 4¼ inches deep. One trouble with the deep frame is that the bees will eat away all the stores next to the top where it is the warmest, and the bees sometimes die because the clusters are left high and dry.—ED.]

GOLDEN'S LATEST SECTION-CLEANER.

Some Essentials of Construction; Sandpaper on a Solid Disk Not as Good as Sandpaper on a Yielding Belt.

BY J. A. GOLDEN.

Referring to your footnote, I did not expect my section-cleaner to be made like a sewing-machine. I have made a rough machine to show the bee-keepers about how they may be constructed, and surely they can be made quite cheaply at the factory. This one is made all of wood excepting about 16 bolts; wheel, mandrel, and all. The base-apron which the back roller rests on is a 1½-inch board 4 inches long, and as wide as the space between the top boards. Two holes are bored, one on each side, and uprights put in for the back roller to revolve in; opening at top is to admit roller-mandrel. Two strips are tacked on side boards, inside, for this board to slide on. A hole is bored through lengthwise, and a wooden screw, or iron, as you can



see in the picture, to tighten or loosen the belt, is used. This is a little different; but the wheel set down on a slide would be the easiest. There could still be a more simple and cheaper machine than even this constructed.

I have received quite a number of letters from bee-keepers and honey-dealers, complimenting me in regard to the wheel device—Doolittle, Dadant, and others.

You seem to think you have something that will outshine all others. Well, I will insist on your trying the belt alongside of a solid-surface disk or wheel. You can dab a section on a belt, and not even jar the comb; but on a solid surface you must be very careful.

Reinersville, O., Feb. 11.

[I have no doubt, friend Golden, that the belt will prove superior to the disk; but my idea was to develop a cheap machine that everybody can have. Where one has a large number of sections to clean, say fifteen or twenty thousand, it would pay him, no doubt, to have a section-cleaner something like what you have shown us in the photo, even if it did cost ten or fifteen dollars. But, friend G., you have not yet told us whether there is any difficulty about propolis filling up the sandpaper; neither have you told us whether it is better to clean the sections in cool weather than in warm. In your next, please enlighten us on these points, and then tell us whether coarse, medium, or fine sandpaper should be used.—ED.]

ONTARIO CO. BEE-KEEPERS' CONVENTION.

Different Pollen Substitutes; Feeding Milk, etc.

BY F. GREINER.

There were some interesting subjects discussed at the Ontario Co. bee-keepers' convention last month, and some points were brought out that may be of value to many others; so I will make the attempt to present some of them — perhaps enlarge upon them — as the spirit may move.

Mr. Perry, of Bristol, gave it as his observation that it is not always the colonies numerically the strongest that gather the most honey. He ventured an explanation of this peculiarity, saying that it might be possible for a colony to rear too much brood, more than they could feed, and that thus the individual bees would not have the vitality, longevity, and general business qualification — yes, not even the size — that bees do from other colonies that were fed more plentifully. The main trouble might lie in the lack of enough pollen.

The discussion on the subject drifted this way and that. It was suggested that, if there were an insufficiency of pollen, a proper method of feeding might obviate the trouble. Prof. F. Benton made mention of the prevailing custom of bee-keepers in Germany, who save up great quantities of honey and pollen for feeding by the unique way of throwing the honey and pollen-containing combs into a big barrel or hogshead, pounding them down, filling in more, pounding down again, continuing in this way till the receptacle is full. Sometimes they keep such honey over for years, and always have a lot on hand for an emergency, regulating the quantity according to the number of colonies they keep. This feeding-honey is harvested every fall by "taking up" the colonies not having sufficient winter stores. It is as salable and as valuable as any other kind of honey. I think that, if Mr. Perry had such honey to feed to his bees, perhaps they would all have as vigorous constitutions as he could desire.

Mr. Chester Olmstead kept the bee-keepers of the convention in suspense for a while by his statement that he had fed pollen to his bees, and found it to be an excellent stimulant. Bees fed on it had outstripped the rest

of his bees. He had laid up quite a supply for the coming year.

Some speculating heads began to suspect that perhaps Mr. Olmstead was running some sort of pollen-gathering institution in opposition to the bees, perhaps even gathering honey. Finally he, in an unselfish manner, disclosed his secret, saying that he had gathered the pollen with his own hands from the corn-tassels by going around in the field with a boiler-cover, holding the same beneath the tassels, giving them a vigorous shake. A portion of the dislodged pollen would, of course, land on the cover. Thus he had proceeded, and gathered, I think, two gallons of the pollen, which he had mixed with honey and put up in cans for future use. Mr. F. Benton suggested keeping the pollen in the dry state.

It might be well for bee-keepers not to overlook the fact that Mr. Olmstead had found it very profitable to feed his bees on this self-gathered pollen, and that the German bee-keepers practice a similar method. All bee-books and other instructors advise stimulative brood-rearing by feeding small quantities of honey or syrup; but less frequently do we hear of feeding pollen or any substitute. There can be little doubt that a great deal could be gained by doing so in some instances. For localities that furnish little natural pollen early in the spring, it might prove a grand thing. Of course, flour is sometimes offered to bees; but in the manner it is offered, it is laborious for the bees to gather it up, moisten it, and pack it into their pollen-baskets. The weather is unfavorable, oftentimes, and then the bees can not profit by it.

It may not be known to all, but for a great many years Rev. Wygant, of Flacht, Germany, has very successfully used wheat flour and honey, in the proportion of 1 to 10 or 15, which mixture he poured into drone-combs and inserted these into his hives next to the brood. Whole-wheat flour contains all elements necessary to sustain human life in a well-proportioned order. According to the analysis I have, it is not so very much different from pollen. It will, therefore, make a very good and cheap substitute. Mr. Benton recommended pea flour as the very best of all cereals. Would it not be well for many who are concerned in this stimulative feeding to give this flour-and-honey mixture a trial? Wygant says a quantity of one or two quarts may be given at a time to a good populous colony, as the mixture will not readily ferment. In this respect it has the advantage over the milk-and-egg food, which was also mentioned in our discussion, but not fully discussed. As there was a desire manifested to bring this milk diet before the bee-keepers in some of our journals, give exact formulæ, etc., I take this opportunity to give an extract from a long article on the "proper use of milk as a bee-food," which appeared in No. 7 of the *Bienen Zeitung*, 1897, from the pen of Emil Hilbert, the originator of the egg-and-milk diet. For more than 25 years Mr. Hilbert has practiced this, and, of course, has discovered certain facts in regard to it. These, as I find them in the article, I will now give as briefly as possible:

Stimulative feeding with any kind of food is like a double-edged sword in the hand of the careless and inexperienced. Especially is this so with the milk-and-egg preparations. One should know the exact wants and needs of his colonies, and then supply them. All know that milk and eggs are subject to decomposition —that they easily sour and spoil. If more is fed at a time than can be consumed immediately, it will make trouble. Cleanliness is one of the great essentials.

The milk of different animals is not all alike in its composition. Goat's milk differs in composition from cow's milk. Even the milk of two different cows may differ considerably; so we need not expect cow's milk to be exactly like bee-milk (for a sort of milk it is) the young bees, the larvæ, are brought up on. Cow's milk needs sugar to make it a balanced ration for the bees. Feeding sweetened milk does not excite a colony like feeding honey or even sugar syrup; but it had better be done at night. During the day, milk should not be fed unless the temperature is high enough so bees can fly — not less than 55 degrees F. Should the mercury sink below 46 in the evening, do not feed. After having been obliged to omit feeding on account of bad weather, do not resume the practice until the bees have a chance to fly. Bees have not the ability to separate milk from sugar, and for this reason it will not do to feed alternately honey, then milk, for they would store it mixed in the cells. The feeding of milk must be suspended as soon as honey comes in above the immediate needs of the bees, for the same reason. The storing of the sweet milk must be prevented by all means. Every colony fed with milk ought to have an abundance of sealed stores. Strong colonies are better suited for it than weaker ones. Strong colonies can be made to just boom. Feeding milk puts them in good condition to build comb.

The milk should be fed warm — about 76 degrees F. The bees will take it up quicker, and have the benefit of the warmth besides, which is an advantage. The food might be poured into combs, and moved up close to the brood; but with every opening of the hive there is always a loss of warmth connected, and this should be avoided if possible. It is best to feed under the brood-nest in shallow tin dishes, using a varnished wooden float. In preparing the food the freshly drawn milk is brought to a boil to destroy all bacteria; two pounds of sugar is added to each quart of milk, although, after the bees get used to this milk food, the amount of sugar may be gradually decreased to half that amount. If less sugar is used, the bees refuse to take the food. Sugar is better suited for sweetening the milk than honey. The slight degree of acid in the latter curdles the milk. The sugar will dissolve better in the hot milk when first moistened with hot water. After the sugar is all dissolved, bring the mixture again to a boil, and skim. If a little salicylic acid is added to the milk, say as much as a pea to a quart, decomposition will be greatly retarded. The acid will have to be dissolved in half a thimbleful of alcohol, and a spoonful of boiling water before adding it to the milk; but this addition is not strictly necessary.

Milk should not be fed until the bees are active in the spring, perhaps in April. Begin with one-twentieth to a tenth quart once a week, according to strength of colony; increase to two feeds per week. When, during the latter part of May, a colony has nearly reached its maximum strength, occupying about 10 L. frames with brood, the amount of feed may then be as much as one-fifth quart, two or three times per week. To feed more or oftener is not profitable but dangerous. Foul brood is sometimes hinted at as the result of imprudently feeding milk or egg.

Thus far from Hilbert.

Wygant thinks it best to add to the milk some wheat flour in order to make the food more the consistency of the milky bee-food or the royal jelly. No doubt this feeding of bees admits of considerable variation. Some years ago, before I had had any experience with bees except, perhaps, that I had hived a very few swarms for some of my neighbors, I was told once by an old fogy bee-keeper that he used to feed his bees pancakes and molasses. I was at once inclined to ridicule the pancake theory; at any rate, I didn't believe it. With the present light I have, *nothing* will surprise me any more. Bees have been said to eat ducks, and I am not sure but also sheep—not

literally, of course. But let me tell you, that old bee-master Wygant, mentioned several times before, has fed and fattened his bees, not only on milk and egg, barley and oat soup, on wheat flour, but also on bread and butter and cheese; on potatoes, meat, etc. What are our foods, anyway? Chiefly a composition of the very few principal elements, one differing from the other only slightly in its make-up. For instance, while starch may differ in looks and taste from sugar, the elements they are composed of are about the same. A kernel of wheat contains nearly the same elements as the egg, while the kernel of corn does not; it has a great overplus of heat-forming elements, and in order to make a balanced ration out of it for horse, cattle, swine, or poultry, bees or man, bone and muscle forming elements will have to be added.

Then, again, we take the kernel of wheat and feed it to the hen; the hen converts it into the egg; we take the egg, subject it to incubation, and, presto! the elements formerly contained in the eggshell are changed into meat, blood, and bone; we have a chick; we feed it the kernel of wheat again, and we have the broiler, the roaster, the matured capon.

Then, again, we take the same indestructible, everlasting elements, as they appear to us, in the form of nitrate of soda, or perhaps ammonia, in the potash, in the phosphoric acid; we feed them to the corn-plant; in due time nature changes them into the heat-producing corn, the muscle-producing pollen, and so they go the rounds. The meat that came from the egg was nursed up by the wheat kernel. Let us take it, dry it, pulverize it perfectly, make it palatable for the bee by means of a sweet liquid, and they will eat it and do well on it (they will eat the duck). Or take the meat and convert it into Liebig's beef extract, sweeten it, and the bees will do well on that (they will eat the sheep or the beef).

Take the Switzer cheese, the most concentrated substitute of pollen, containing, I think, 62 per cent of albumen; offer that to the bees in a form that they *can* use it, and they *will*.

At last the potato, the poorest of all the pollen substitutes, who says the bees could not have a picnic over that? Just try it, although the potato contains only 2 to 3 per cent of albumen, but all the more of the starch, which the bees will manufacture into sugar. Boil the potato till it is mealy; mash it and mix it into your feeding-honey or the sweetened milk. They will eat their pudding and milk without asking for even a spoon.

It is a strange world, this world of ours, and yet how simple! In feeding bees we must take into consideration the end to be accomplished. During the winter a colony of bees does not need to build up any new frames, but must keep from freezing; hence very little of the bone and muscle producing food is required by them, but all the more of the heat-producing. Honey will just fill the bill. Just as soon as breeding commences, then they must have the other—the pollen, the albumen from the egg, the milk, the lean meat, or whatever substitute is at hand.

The apiarist of to-day, the farmer, the cook, all ought to have at least a rude knowledge of chemistry or they may ofttimes be wandering in the dark. Let us learn to apply science more in our pursuit of bee-keeping.

I started out with the intention of reporting our bee-keepers' convention, but I drifted ashore. If I succeed in getting the old shell back into deep water I may try it again.

Naples, N. Y.

THE WISCONSIN BEE-KEEPERS' CONVENTION.

The Good Work of the Foul-brood Inspector, but Hampered by a Lack of Funds; Honey vs. Sugar; Freight Rates, etc.

BY H. LATHROP.

The fourteenth annual convention of the Wisconsin Bee-keepers' Association was held in a room of the capitol, at Madison, Feb. 2 and 3. There were about twenty-five bee-keepers present, including all the officers. We had a good convention and a good time, and believe some important work was done. We are learning to devote more time in our State association to general measures for the good of our industry, and leave more of the A B C work to local meetings and institutes.

One of the first things that came before the convention was a brief report from State Foul-brood Inspector N. E. France. He stated that he had traveled 3800 miles in the discharge of his duties; he found foul brood existing in 27 apiaries situated in several counties. In the majority of cases these apiaries were cured after the first visit by carrying out his directions on the part of the owners. In cases of failure it was invariably caused by a failure to do as directed. Many copies of Dr. Howard's pamphlet, with Mr. France's appendix, giving full instructions for the cure of the disease, were distributed.

Mr. France found many cases of the disease known as "pickled brood," which usually disappeared toward the latter part of the season, without treatment; he does not think it will develop into foul brood without infection. Very fine salt sprinkled over the combs seemed to aid in cleaning it out.

He found a large number of bee-keepers who took no paper on bee culture, and, as a result, often lost money by not being posted on markets and methods. The inspector was hampered in his work by the fact that the appropriation of $500 by the State had to cover all expenses, including transportation. The executive officers were instructed by the convention to apply for free transportation over the railroads of the State, for our inspector, the same as is allowed to other State officers.

The question, "How can bee-keepers increase the demand for honey?" was discussed. Mr. Lathrop advised that bee-keepers set a good example by using more honey and less sugar in their own homes. It has proved its superiority as a healthful food, and can be used largely to take the place of sugar. Mr. Wilcox said bee-keepers would do well to stamp their name and address on each section of comb honey, so that consumers would

know where to procure a further supply. This practice was often the means of bringing new customers; but only honey of good quality should be sent out. Much honey may be sold at the bee-keeper's home by having a sign up, "Honey for Sale."

Mr. Winter advised advocating the use of honey through the printed page, and by personally informing the public of the value of honey as a health food. All agreed that the standard of extracted honey should be maintained by extracting no honey until it has been thoroughly ripened on the hive.

The convention voted to make application to the Western Classification Committee to change the ruling in regard to bees in hives less than car lots. At present such shipments can be sent only by express at exorbitant rates. It is claimed by practical bee-keepers that hives properly prepared can be safely shipped by freight; and if a favorable ruling can be procured it will largely increase the sale of bees, and consequently increase traffic for transportation companies.

On the question of making a State exhibit of honey and apiarian supplies at Omaha, it was the opinion of the members present that it was inadvisable. Mr. Wilcox stated that it would require at least $300 in order to make a creditable exhibit. This amount of money we can not raise, as our industry is not yet recognized by our State to the extent that they will make such appropriations for our use.

The convention voted against making such exhibit. The general opinion seemed to be that these great and expensive exp sitions occur too often in our country at present, and are promoted by a ring of people who wish to make big money out of them.

A resolution was passed, favoring the amalgamation of the North American Bee-keepers' Union and the United States Bee-keepers' Union. The following officers were elected: President, Frank Wilcox, of Mauston; Vice-president, Jacob Huffman, of Monroe; Treasurer, H. Lathrop, of Browntown; Secretary, N. E. France, of Platteville.

Browntown, Wis., Feb. 12.

"FACING" COMB HONEY.

A Reply to Aaron Snyder.

BY J. B. WILHELM.

On page 83 Mr. Aaron Snyder comes down somewhat severely on farmers, and especially on bee-keepers, as a dishonest class of people. You will always find people in any occupation who do not have a surplus of honesty, no matter where you go; but that is not saying that a majority are so. I have no doubt The A. I. Root Co. buys and sells more honey than Mr. Snyder; and in their comments on his article they say there was no evidence of facing any of the lots sent to them. I saw some of the same honey at their store, but I do not think, to judge by the weight of the cases, that any of the honey was faced. I might, probably, have placed the honey in a different grade; but in the locality where it was produced they would have called it fancy, where I probably would have graded the same only as No. 1. They might have called it "white," and I called it amber; but I can not see how a bee-keeper can place an inferior article of honey in the back of a case without being detected by the weight of the case itself, knowing the number of sections in a case. The most of my honey I have sold in the home market to private families and to the grocery trade; but never have I had any trouble in selling again where I sold before. But often have I been complimented because my honey was so very nice, and asked by some of these wise grocers how I made it so nice and white. My answer would be, "Do you think I was skillful enough to finish or shape such a delicate article as comb honey?" But if such great men as Dr. Talmage make erroneous statements concerning the honey-bee, it may be overlooked with smaller lights such as grocers and consumers of honey who could not distinguish the difference between a bee and a green horsefly.

If Mr. Snyder will look up instructions for barreling apples I think he will find that they all want the end of the barrel faced. But this is not saying that you shall place very nice apples in the bottom and head of the barrel, and fill up the center with knotty and gnarly fruit; this would be overdoing the matter. You can not go into the market in any place and buy apples, peaches, pears, plums, strawberries, or grapes — yes, nor even cabbage — unless it is so placed as to make the best impression to the eye possible. Why, even in nature, in God's own store, you find it so. Look at the fruit on the trees, and you will find the nicest specimens of the fruit where it will attract the eye. No wonder that mother Eve was tempted! I wonder whether she felt toward the Lord as does Mr. Snyder toward bee-keepers.

But, to cap the climax, Mr. Snyder quotes a New York farmer as baling bog hay and wrapping it with good hay so as to sell for first quality. With the baling-presses used now it is an impossibility to bale hay in such a manner but that every forkful fed to the press will show. With the old presses used thirty or forty years ago you might have done such a thing; but the cost would have overbalanced the profit. I should be as safe in offering $1000 reward for baling bog hay, and facing or wrapping the same so as to sell for choice or No. 1 timothy, as is Mr. A. I. Root in offering $1000 for a sample of comb honey made by man equal to that made by the bees.

Now, if some people will read Mr. Snyder's assertions they may have reason to think that the majority of bee-keepers, farmers, and fruit-raisers are rogues and thieves. How could they doubt it? Here it is, black on white, by a bee-keeper himself. A little more charity in your next article, Mr. Snyder, and not such sweeping assertions.

St. Stephens, O.

[I do not think, friend W., that Mr. Snyder really meant to say that bee-keepers are a dis-

honest set so much as he desired to stir up discussion. He not only stirred up discussion, but he stirred up a bees' nest of bee-keepers. As I said at the time, I think it would do no harm to have the subject ventilated. From present indications it would appear as if, when honey is faced, it is with no intention of deceiving, but simply for the purpose of making a display. With regard to the baled hay, no doubt you are right.—ED.]

ACETYLENE GAS.

The Nature of it; Conditions that will Cause Dangerous Explosions.

BY C. H. DIBBERN.

So much has been written of late, and so many statements have been made that are misleading, if not absolutely dangerous, that we have concluded to give a disinterested statement of our experience.

About four months ago, after reading Mr. A. I. Root's account in GLEANINGS, we decided to put in a generator for lighting our store, wishing to use about twenty jets. We corresponded with various parties manufacturing generators, and found there were quite a number of them, usually each claiming to be the very best, and the other fellow's contrivances were either unsafe or of no account. After investigating matters a while, and comparing the merits and prices of the different generators, we decided on one having about double the candle power we were likely to use. We consulted the insurance companies, and found they insisted that the generator must be placed at least 50 feet from the building, although the manufacturer claimed it would be "absolutely safe" to place it in the cellar. We, of course, wanted to comply with the insurance rules, although we thought it a useless expense, but are now very glad we did so. It is absolutely necessary to keep the place, where the generator is put, from freezing, so we constructed a sort of vault, nearly entirely under ground, and large enough to hold the generator and allow a person to get in for any purpose. The vault is of brick, and cemented like a cistern, and is covered with a double roof to make it frost-proof. When we need to refill the carbide chamber there is always plenty of daylight. The top is lifted off, otherwise it would not be safe to take a light of any kind, as enough gas might have escaped in some way to render the air in the vault highly explosive. From the generator a half-inch pipe is laid about a foot under ground, 50 feet to the building; then for 100 feet more along the ceilings to where the lights are wanted. The fixtures are constructed of ⅜ gas-pipe, with the usual brass fixtures.

We have finally adopted the Naphey jet, which consists of two jet-points bent toward each other so that the two streams of gas, about the size of a needle, meet midway and flatten out, making a flame about the size of a half-dollar. We are well pleased with the light, and can use from one to twenty jets, as the gas is generated automatically only as fast as used. The light is as clear as sunlight, and shows colors better than any other light. One must not look directly at the light very long, and then attempt to read or write, as the effect is about the same as looking at the sun.

As a great many are now talking of putting in this light, and as agents are going from place to place putting in "plants" of various kinds, many of them any thing but safe, we want to give all readers a word of caution. We think the arrangement as we have it is fully as safe as city gas, yet it is well to consider the nature of acetylene gas. That it is highly explosive can not be doubted, as a mixture of 15 per cent with common air renders it explosive, and for this reason it is well to be sure that pipe and fixtures are absolutely tight, and that all cocks are closed. We hear of some agents putting generators in cellars, and some manufacturers advise that course. Now, we consider that, according to our experience, absolutely dangerous. The nature of acetylene gas is such that it will find an exceedingly small hole, and we found our generator, as sent out, had several leaks, as also had some of our gas-fixtures. Then, too, we found that, when the gasometer was full, and generation of gas should stop, it would still generate to some extent, and bubble out from under the gasometer. It would not take long to release 15 per cent in a cellar; and then suppose one went in with a light to see how things were going, what would happen? Or suppose the building should get afire, or be struck by lightning, there would surely be a terrific explosion when fire reached the gas in the generator. We believe acetylene gas would create about as much havoc as so much gunpowder, and it is always safe to be on the sure side.

If you doubt that the gas is explosive, just take a match and let it burn a minute, and blow out the flame, and hold the coal spark in the gas turned on from a burner, and it will invariably take fire.

Notwithstanding all the above we are pleased with it, and, with all due safeguards, is no doubt the "coming light." We do not see how it could ever be a success, or even safe to burn in a lamp to be carried around, and it is well to go a little slow on this point.

You have no doubt read of several fatal explosions caused by acetylene gas; but all such, so far as we can learn, were caused by gross ignorance or criminal carelessness. Carbide is a good deal like quicklime, as it will slack if exposed to damp air, only that it generates an explosive gas. Now, if a quantity of the carbide is dumped in a closed room, or, worse still, a cellar, and allowed to partly slack, a serious explosion may result. In our opinion, carbide should always be kept air-tight, and it is usually shipped in such cans; and in such form is absolutely safe, as there is nothing to explode. If this article will prevent a single explosion, we shall be fully paid for writing it.

Milan, Ill., Feb. 7.

ADVICE TO BEGINNERS.

Question.—I am about commencing in bee-keeping. I have subscribed for GLEANINGS, and see that you have a query department in said paper. Will you kindly give some advice to a beginner—about what he should pay out in the start, whether it is well to try to make the things he is to use, or buy them? any items looking toward success—what temperature the cellar should be kept where bees are being wintered therein? at what degree of heat it is safe to let bees fly where they are wintered on summer stand, and any other information which you may think of use to a beginner?

Answer.—In replying to this inquiry I will try to say a few words for beginners in bee-keeping, or those contemplating starting out in such business, and perhaps they may apply to some who have kept bees several years. I would not consider it good policy to pay out more than $40 to $50 in starting, including bees, hives, books, and all. If you do not buy more than from two to four colonies, and the latter should be the limit (in my opinion) for the one who has had no experience in the business, $50 will cover all necessary expenses. If you are a good workman, and have the necessary tools, I would advise making all the needed wares after you have started, except the sections which you are to use, for in this making you will not only be self-supporting, but this part of it will put into you an enthusiasm which will tend much toward success. It is doubtful whether any one, no matter how good a workman, can get out sections by hand that will in any way compare with those now on the market, at prices which would not even give a living to the one who tried to get them out by hand. Hence I would advise all, who do not have machinery suitable for the work, to buy their sections in the flat. When I first began bee-keeping I was charged $20 a thousand for sections in the flat; and as I thought that a high figure I purchased machinery and manufactured sections for sale. The price soon went down to $15, then to $10, then to $8, then to $6, at which time I said, "Others can have the trade; it will pay me better to work at something else." But as I had the machinery I continued to get out my own sections till the price fell to $3.50, when I concluded that I could not afford to run my own machinery, after paying the price for lumber which I had to, at retail, if I had any respect for the worth of my time and the use of the machinery. And now any one procuring 5000 sections can easily get the same at $3.00 per 1000, and, what is more, the sections which we used to pay $20 a thousand for would in no way compare with the $3 sections of to-day. In no other one thing has there been a greater improvement along the bee-keeping line than in sections since they first came into existence.

It is well to make sure you start with good hives; then do not get crazy over the "puffing" of wares by those having said wares for sale, and pay out your hard-earned dollars (earned in some other business), more than just to get a start. Make your bees and yourself self-sustaining; and after the first start do not pay out any thing more than what the *bees* bring you in, always remembering that, if you can not make four colonies pay, you can not make four hundred. If you should happen to make a failure of the business, you will have the consolation of knowing that you have lost but from $40 to $50, instead of $300 to $400, or perhaps as many thousand, as some have done.

There seems to be a proneness to go into the bee-business more recklessly than into almost any thing else. I suppose it is on account of the "bee fever" which seems to seize nearly all who become interested at all in the matter, and this recklessness is to be deplored wherever found. Be willing to start at the bottom of the "ladder," and work your way up, the same as you would do in any other business. Also remember that, if you would succeed, you must look after your bees. If any person expects to realize a large income from his bees, and never looks after their condition (simply hiving the swarms and putting on the sections), he will find himself greatly mistaken. No man would treat his horse or cow in that way; no, not even his pig. How many who read this know as much about the condition of their bees as they do about the condition of their horse, cow, or pig? Failing to thus know, you are not caring for them as well as you would for such stock, and therefore you can not expect any more profit from the bees than you could from a horse, cow, or pig, under like circumstances. You should see your bees often; and if they are in the cellar, keep the temperature of that cellar from 42 to 50°, if possible, and do not let the dead bees accumulate on the floor to get mashed, and mold there, thus making the air unfit for any animal life. If your bees are outdoors, and the mercury rises to 45 or 50° in the shade, with the sun shining brightly, and the atmosphere still, let them have a cleansing flight, no matter if the ground is covered with snow. Bees can get off the snow just as well as from bare ground, if the snow is not too light (that just fallen so it will let the bees sink into it), and the air and temperature as above. Do not let any colonies starve or suffer from lack of attention on your part; neither disturb them during winter unless you know that they demand your attention, for "over attention" during the winter may prove as bad or worse for the bees than a lack of the same. In fact, do things at the right time, and in a proper manner, leaving nothing undone that will contribute to your success. Bee-keeping pays only when our pets are properly cared for and if any one can not spend the amount of time on them they require, he or she had better keep out of the business; for sooner or later they will turn from it in disgust, and lose all they put in it at the outset. But, making a success of bee-keeping, then you should be willing to impart to others a knowledge re-

garding the thing which contributed to your success, if you wish the greatest remuneration from your labor. It is said that Lord Charles Beresford received a most romantic reward for what he did some years before. One bitter night, when his ship was off the Falkland Islands, there was a cry of "man overboard!" The fallen one had disappeared beneath the floating ice. Lord Charles, though clad in heavy garments, instantly seized a coil of rope and plunged into the sea. Down, down he went till he almost feared that the other end of the rope had been insecurely fastened. But he soon seized his man; the rope tightened, and the ship's corporal helped them both out. Several years elapsed; and one night, when Lord Charles was speaking in a crowded auditorium, there was seen a commotion near the door. Cries of "put him out!" were heard; but Lord Charles invited the man to come up to the platform, and they would listen to what he had to say. In great excitement the man struggled forward. His great desire was to shake hands with his rescuer. He was the sailor who had been saved from the icy waters off the Falkland Islands. No other investment brings back such rich reward as some exertion or sacrifice which we may make for others. It is not the bee-keeper who is all the time looking out for "number one" who is the happiest or receives the greatest reward from his pursuit, but the one who gives the most of what he knows, to help sweeten the lives of others.

INTERESTING OBSERVATIONS; HOW BEES SEE IN A DARK HIVE.

Without entering into a dissertation as to the nature of Rœntgen's discovery, or attempting to deal with the peculiarities of the ultra-violet end of the spectrum, it is plainly apparent that there are rays of light of which but little is known even in this age of discoveries. Thinking of this, and after close observation, it has occurred to my mind that, although human vision is apparently not endowed with such rays, some insects have the power of utilizing them to a great extent. For example, the question arises, How is it that bees pass out into bright sunshine from the absolute darkness of a hive's interior, and fly off without hesitating for a second, and evidently without any inconvenience from the sudden change? Should we attempt the same thing our vision would be perceptibly affected for some minutes. Again, what power of vision enables bees to work with such beautiful accuracy in complete and utter darkness? Or, to go still further, place a sheet of foundation in a strong colony, and, when the comb is drawn out, watch how the queen will deposit a small patch of eggs (somewhere near the center of the new comb) about as large as the palm of one's hand; then see how she will pass to the other side of the same comb, and, without hesitation, commence laying her eggs in the cells whose bases occupy the other side of the septum or midrib, so that the brood would lie back to back, as it were, for mutual warmth. What power enables the queen to do this? Can she see through the wall of wax against which the cells are built? The same may be said of worker bees and honey-storing. With equal regularity do bees fill the cells on both sides of a comb. How is it done? Do they utilize the X rays? I put these queries, in which there is a field of research for any one of a scientific turn, and I leave it for exploration during the dull season. Many other items in the economy of the hive clearly point to the peculiar and extraordinary range of vision possessed by bees, requiring study to throw light thereon.—*Henry W. Brice, in British Bee Journal for Dec. 30.*

[The foregoing is not fanciful, by any means. It is, indeed, wonderful how bees can go from absolute darkness to the strongest light. It is equally wonderful that the queen can lay her eggs opposite, as she does, in little patches. These phenomena can be accounted for only on the supposition that the bees have two kinds of sight—one like ours, and the other something after the order of a Rœntgen vision. Who is so wise as to tell us beyond a peradventure?—ED.]

THE MOSQUITO-HAWK AND THE HARM IT DOES TO BEES.

I never realized till this year how much harm the mosquito-hawks do to our bees. For two months last spring I killed every day from 10 to 440, depending on the weather for them to fly low or out of reach—an average of 100 a day. I am certain that I never killed a tenth of the hawks feeding all the time on the bees; and counting only ten bees to a hawk each day, when each one may kill 40 or more, you have a total of 10,000 bees gone every evening.

Francis, Fla. AUG. LEYVRAZ.

DOES SANDPAPER ON THE SECTION-CLEANING MACHINE FILL UP?

In regard to a machine for cleaning sections, you say, on page 100, you are afraid that the sandpaper will become filled with propolis, which it does. I made a machine *a la* Golden, which works well for five or six sections, when the *sandpaper* gets filled with propolis so badly that I have to renew it. The machine isn't much faster than scraping by hand, but does better work. R. B. LARKIN.

Pueblo, Ind.

[Your experience does not accord with mine, friend L. I have tried a good many more sections than the number you refer to, and, contrary to what I expected, there is almost no trace of propolis on the paper. Perhaps that which you use is too fine. It ought

to be at least as coarse as 1½; possibly 2 would be better. But, understand I do not say that sandpaper will *not* fill up, but it has not been my experience thus far.—ED.]

J. A. N., Pa.—Ducks and bees thrive nicely together, notwithstanding the ridiculous statements of some *quacks* to the contrary.

O. P. H., Tex.—Sections 4½x5⅜x1½ you would find a little too large for the thickness of the comb, I think. The 4x5x1⅜ seems to be as large as it is admissible. That holds an even pound. Your 4½x5⅜ would, I think, hold 1⅛ to 1¼ lbs., and it is not desirable to have a section over 1 lb., as customers have the impression that a box of honey should not cost over 15c; and if you were to charge as you would have to for 1¼ lbs. it might make a hard-selling section. If your section is made at all, it seems as if it ought to be a little more than 4½ wide. The regular super is 18¼ long, and ¼ inch play is a little too much. If it were made 4½ plump, say $4\frac{17}{32}$, it would fill out the space better.

L. K., Ill.—You ask why the slats were spaced further apart in our regular fences than in our Ideal. One reason was because automatic machinery made the regular, and hand machines made the Ideal. The first named was spaced for $\frac{2}{11}$ inch, and the last named for ⅛ inch or less; but we have concluded to make the new stock of I fences with spaces $\frac{2}{11}$ inch. We do this because some of our customers like yourself have objected to this close spacing. There is danger, if the slats are spaced too far apart, that the honey will be slightly ridged. Two-twelfths is all right, and causes no ridging; but sometimes the machine would get them a little further apart, and we therefore determined to be on the safe side. But we have made a little change whereby all this will be fixed. The new I fence, or stock, that we are making, from now on will have the slats spaced a scant $\frac{2}{11}$—that is to say, as nearly as we can get it, $\frac{145}{1760}$.

A. B., Texas.—Under some conditions the bees will build straight combs from only a starter 2 inches wide; but the beginner had better use full sheets, otherwise he may have a lot of drone comb on his hands. The condition under which bees will build all worker is just before the honey-flow. If a starter is given them during a time when honey is coming in they may (and quite likely will) build store cells—that is, drone comb.

I see no reason why you could not unite the bees in a box hive with those in your frame hive. Simply proceed by what is known as the Heddon short method of transferring, as given on page 32 of our catalog.

The honey that is taken from the solar wax-extractor is inferior, both in quality and color, to honey taken out by the ordinary honey or centrifugal extractor. It is not customary to throw chunk honey—that is, honey in the comb—into the solar wax-extractor unless it is so badly broken that it is desirable to secure the wax and the honey in separate lots. The better way to dispose of chunk honey is to put it up in pails or glass jars, and sell it in the local market. If sent to a commission house it will bring a low price, because the buyer—that is, the one who purchases of the commission house—is liable to think it is nothing but glucose and chunk honey.

J. H., N. Y.—The worst objection I see to the Manum hive is that it is rather large and expensive—a good hive, by the way, if one is willing to pay the extra difference in price; but I really can not see how it will produce more honey at less cost than our more cheaply constructed Dovetailed chaff. With regard to the chaff rattling down, or settling, so as to leave only air-space between the two walls, I will say this may happen if the hives are not tightly packed. It is our rule to pour in the packing-material, and ram it with a board, about as you would ram a wad in a gun. The packing-material is poured in and rammed; more is poured in, and then rammed again. We have packed hundreds of hives in that way, and the packing material never, to my knowledge, settled away from the top of the space between the two walls. Perhaps you wonder how I know. When we had foul brood a few years ago we had something like 60 or 75 two story hives infected that were packed in our usual way. In order to make a good job of disinfection the bottoms were removed, and the chaff pulled out and burned. We found that it was packed as solidly as the day it was put in, and nice clean, and dry.

With regard to your plain section, 7 to foot, 4¼ square, I can not for the life of me see why they should hold such scant weights. By looking at your separator I find some of the cleats are a scant $\frac{2}{11}$, and some only ⅛ inch thick. If they were of the latter thickness this would account for the shrinkage in weight, for in that case the separator would have ½ bee-space and the bees would take the other half out of the face of the honey; and as the combs would be a whole bee-space thinner, figuring ½ bee-space for both sides, this would, of course, make up for the light weight per pound. We have been careful to make the thickness of our cleats exactly $\frac{2}{11}$ in. As every thing about our fence is made by machinery, it is fair to assume that we get more uniform results than you secure from the double-cleated separators with cleats of varying thickness. Indeed, I know that some who have used plain sections 1½ inches wide and 4¼ square, with fence such as we use and recommend, have secured combs weighing on an average the same as combs in old-style sections with bee-ways 1⅞ wide.

But suppose, for instance, that our 1½ plain sections would run only about 12 or 13 ounces. I am not sure but it will be a blessing in disguise. The markets everywhere are clamoring for ten-cent comb honey; and the only way that is practicable to put honey on at that price is to have ¾-pound combs.

EIGHT extra pages again.

So far bees have wintered most excellently, and reports generally throughout the country indicate the same thing. But, hold on! It is sometimes more difficult to spring than to winter bees. We shall see how it will be this spring.

WE are having a very warm, wet, muddy March. If this warm weather continues much longer I shall be fearful for results later. There never was a truer saying than that "when March comes in like a lamb it goes out like a lion;" and it is then that the bees catch it—especially the brood.

THAT BLIND EDITOR.

SOME chap in the *American Bee Journal*, referring to my early disapproval and subsequent approval of the plain section, accuses me of being *blind* when I *want* to be blind, and of being able to see when I want to *see*. I take it that this is a polite insinuation that, when it is to the interest of our supply trade to recognize the merits of a good thing, I am loud in my praise of the thing in question; and that, when it is not to the interest of our supply business, then I am very *mum*. Naughty York, not to put on his name and *address!* I wish I could just catch that fellow without a name. I would show him that even *he* looks through a glass darkly, for it is very evident he fails to see that I have not been as naughty as he thinks. However, I will forgive him, for, though not committing himself directly, he apparently thinks the plain section and fence a good thing.

BEE-VEILS FOR THE KLONDIKE.

WE have been selling hundreds of bee-veils, and especially the globe bee-veil, for use at the Klondike. When we heard they were selling like hot cakes, for a region that is supposed to be colder than most inhabited localities in the world, I wondered what they were for. Then I was told they were to keep off "skeeters," for they are actually thicker there than in Florida and other mosquito-infested countries. The worst part of it is, they are mammoth in size, and can take a horrible bite. If reports are correct, it is something of a problem to know what to do with dumb animals because of these same blood-suckers. The report does not say whether they are bad during that season of the year when the mercury is below zero; but a "tenderfoot" would suppose they are troublesome only at that season when the weather is warm, if there is such a thing as *warm* in the Klondike.

THE WOLF IN SHEEP'S CLOTHING.

MR. J. M. JENKINS, of Wetumpka, Ala., gives some good-natured kicks and growls at the *American Bee Journal*, and among other things he says:

> I also growl about the way in which you and GLEANINGS, and perhaps other bee-papers and correspondents, sometimes hint at or tell on dishonest commission men. If a commission man does a crooked piece of business, and it is published without his name, what good is done the unsophisticated country sucker who buys your paper, and also swallows the plausible buncombe and flattering testimonials of Wheadon, Horrie, *et al.*, except to make him suspicious of *all* commission men? What's the use of putting us on to 'em after the police have chased 'em out of town and closed up their business?

Editor York replies after this fashion:

> Experienced publishers, and honorable ones, too, have some respect for libel laws, as well as for other good laws. We *can* not publish all that we would, sometimes.

Mr. York has hit the nail on the head. Unfortunately, we as publishers can not even tell the truth in regard to what we are morally certain is truth, unless we can prove the truth by affidavits or other undeniable facts. For instance, I may know positively, in my own mind, that a saloon-keeper is selling liquor illegally; but to *prove* it would be another thing. I may be pretty well satisfied that a commission house is tricky and dishonest; but to come out broadly with the statement might render us liable for heavy damages in a libel suit, for the reason that we might not be able to produce the evidence necessary to satisfy the jury or the court before whom the case might be tried. So the next best thing we can do is to "hint at or tell on dishonest commission men" in a general way. And very often this is all that is necessary. For instance, a snide house may have a very plausible and apparently honest appearance; but a bee-journal can often uncover the swindling schemes they are about to launch forth, i. e., how the wolf has put on sheep's clothing. Whenever that honest (?) old ram comes around, bee-keepers will be able to recognize at once the "true inwardness" of the "baste," whether under the name of A, B, C & Co. or X, Y, Z & Co.

Sometimes we do get hold of enough proof that is strong enough to warrant us in giving names and particulars, but more often not. Most of the dishonest rascals are just "slick enough" to cover up their tracks far enough so that a publisher dare not reveal their swindling schemes in connection with their names.

By the way, I somehow have a sort of inward feeling of rejoicing to know that Bro. York comes in for his share of "kicks and growls." Misery loves company.

VENTILATING BOTTOM-BOARDS.

TWO or three issues ago I asked for suggestions in regard to the construction of bottom-boards that give better ventilation than even our Danzenbaker board with deep entrance; for quite a number, among whom was Dr. Miller, seemed to think that an entrance the full width of the hive, and ⅞ deep, was not enough; that, even when the hive was raised up an inch on four blocks, giving an inch space on the two ends and two sides, this was none too much. In response to my request, various ideas were submitted. From among the lot I selected out a few of the best.

Fig. 1 shows one that makes use of the ordinary shallow entrance; but the side and end cleats are so constructed that ventilation may be secured all around the hive, simply by slipping out the cleats S, S, S, etc.

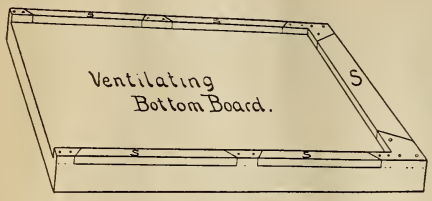
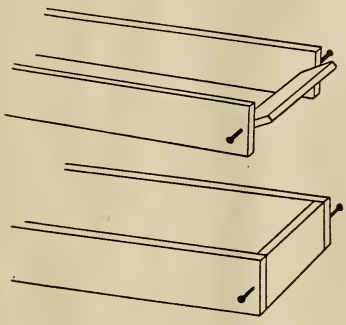
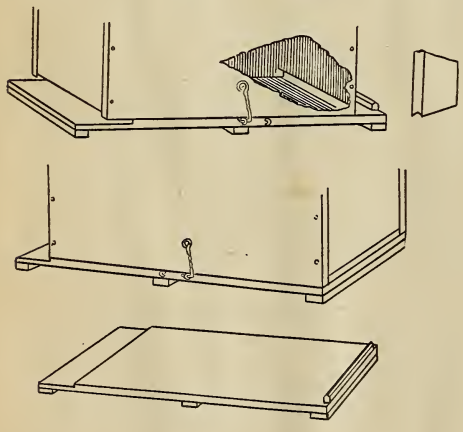


Fig. 2 shows a deep bottom-board having the rear end so it can be tilted out, something like a shutter. This is exactly the same idea that was advanced by father Langstroth in some of his hives away back in the early 60's.



Still another idea is represented in Fig. 3. Extra ventilation is secured by sliding the hive-body forward, much as we used to do the old Simplicity body; but in this case it leaves an opening at the rear as well as at the front.



It does not, however, provide ventilation at the sides. Of the three styles of bottom-boards above shown, the one given in Fig. 1, submitted to us by Stoughton Cooley, Maywood, Ills., is the best. Of it he writes:

With the bottom-board so prepared I began the season with the front closed down to about three inches during the cold spring days. This was gradually widened as the weather warmed and the bees multiplied till the entrance-blocks were entirely removed. When still more ventilation was needed a section of the strip on each side of the front end of the hive was removed. This was easily done by inserting the end of a screw-driver at the front of the hive, and gently lifting till the weight was removed from that end of the bottom-board. The strips come out easily because the propolis at that time of year is soft. When still more ventilation was needed I removed the two pieces at the back part of the hive, and finally the one at the back end. By this time the hive-body was resting on six supports, which kept it in the position it was in when closed, with the frames the same distance from the bottom-board, giving the bees no excuse for building comb-ladders to climb up on, and at the same time there was free ventilation on all sides and ends.

When the harvest was over the process was reversed. As the weather grew cooler the strips were replaced as nearly as I thought the bees wanted them replaced, until, when the cold weather came, they were all closed up as snug as you please.

Every one can test the value of extra ventilation during the height of the honey-flow by lifting his hives up on four blocks, providing he is progressive enough to have his hives on movable bottom-boards.

In several letters of late the suggestion has been made that we increase the bottom ventilation to a hive by lifting the cover enough to let the excess of hot air pass out of the top of the hive. Some have asserted that they are positive they secure more honey, and have less swarming, with hives so manipulated. But there is another class, however, who insist that the super must be hot and air-tight; the drafts of air must not be permitted in the supers while the bees are ripening and sealing honey; that neither process can go on satisfactorily under such conditions; that ventilation must be secured wholly from the bottom.

THE PURE-FOOD CONGRESS.

It will be remembered that Emerson T. Abbott, Eugeue Secor, and Dr. Mason (who didn't go) were appointed delegates from the United States Bee-keepers' Union to attend the Pure-food Congress that met in Washington March 2d. We have just received the following from Mr. Abbott, which will explain itself:

I returned from Washington on Sunday morning. Mr. Secor went with me. The Food Congress was a grand success, and the industries of the country were thoroughly represented. The bee-keepers received full recognition, and our delegates were placed on all the important committees. We got all that we asked for, and I do not think the industry was ever before so thoroughly identified with the other industries of the community. I do not think there is any doubt that we shall get a national pure-food law; and the bee-keepers will be able to take some credit to themselves for its success. I will write the matter up fully for the March issue of the *Busy Bee*, which will be out in a few days. EMERSON T. ABBOTT.

The U. S. B. K. U. has already done a good work in sending delegates to this important meeting, and I have no doubt the results will be sufficient to justify the expectations of the members and friends of the Union. Let the membership continue to "roll up, tumble up, any way to get up." We wish the outside world to know that we are somebody, and that, when we ask for something in the way of protection against the evils of adulteration, we are strong enough to back up our demands.

WISCONSIN FOUL-BROOD LAW.

A COPY of the foul-brood law of Wisconsin, drawn up by its inspector, N. E. France, of Platteville, Wis., is given in the March *Review*. Of this law, Mr. Wm. McEvoy, State Inspector for Ontario, and the one who has done such splendid work in ridding the province of a disease that would have wiped bee-keeping almost entirely out of its confines, says: "It is by far the best in the world; and every State and Province should have a foul-brood law exactly like it." I do not know exactly *why* Mr. McEvoy considered this better than any other law unless it is because it contained this very important section:

SECTION 1. Upon the recommendation of a majority vote of the members of the bee-keepers' societies of Wisconsin, the governor shall appoint for a term of two years a State inspector of apiaries, who shall, if required, produce a certificate from the governor that he has been so appointed.

The other features of the law are similar to the laws in force in other States, with the exception that a sum is appropriated out of the moneys in the State treasury, in an amount not exceeding $500; and the inspector, out of this, is to receive $4.00 a day and traveling expenses for actual time served.

At the time of my visit through Wisconsin in 1895 I heard that foul brood was making rapid advance through the State—so much so that bee-keepers were beeoming considerably alarmed; and the worst part of it was, that a certain bee-keeper whom I had the fortune (or misfortune) to meet, and who had a grievance against another bee-keeper, not only let the disease run riot in his own apiary, but threatened to scatter the seeds in other apiaries providing the other parties would not do so and so. The result was, a concerted action was taken on the part of the different conventions, and a law was formulated, and N. E. France was appointed inspector.

Now with regard to this law again. Many of the foul-brood laws are good so far as they go; but they lack the one thing needed to make them operative; namely, a section (or similar section) like the one given above.

DETACHABLE BEE-WAYS IN SECTIONS.

MR. DOOLITTLE writes an article in the *Review*, protesting against the plain section. The principal ground of the objection seems to be that the edges of the combs are not rounded off so as to leave a sort of wedge-shaped attachment to the section itself. If this objection is a valid one, the fence may be easily constructed so as to secure the same sort of attachment of comb to wood that we find in the old-style section with bee-ways. For instance, if the slats were put close together so the bees could *not* pass or see through them, and the cleats were made to extend clear up the whole length of the section, and ¾ inch wide, I would bet my old hat against Doolittle's that we could have the same kind of fastenings of comb which he thinks is essential. The shape of the comb is dependent, not upon the fact whether the sections have bee-ways or no bee-ways, but upon the *construction of the separator or fence*. Now, then, if, next year, plain sections can be bought for 25 cts. less per 1000, and if the combs of these plain sections can be made to have *either* form of attachment to the wood, the objection disappears Why, it makes no difference whether the bee-way in the sections is detachable or not, so long as it is of the same sort and kind. The plain section has *detachable bee-ways*, and the old-style section, *permanent bee-ways*. The only difference is, the former will be cheaper. I am sorry that we have "an ax to grind" in the matter; but even if we do I can not refrain from correcting what I honestly think is a misapprehension. Mr. Hutchinson, who certainly has no interest in that "old ax," seems to think a good deal as I do, and that is why I make bold to place emphasis on this point.

STORING HONEY IN CISTERNS.

R. WILKIN, of California, reports that he has 14 tons of extracted honey stored in his concrete fire-proof storehouse, which he is holding at 5 cents. As there is not likely to be any California honey this season, the last year's crop will probably be snapped up.

But my purpose is not to give friend Wilkin a free advertisement so much as it is to refer to the fact that he stores honey in a *fire-proof concrete* reservoir. I hope he will send us a photo and description of the storehouse. I am just Yankee enough to want to know whether he has found it practicable to store honey in a reservoir of brick or stone lined on the inside with water-lime or Portland cement. If he has, then when we are short of storage-tanks or barrels, *perhaps* we could store the honey in empty cisterns, then draw or pump it out as might be required. Who is there among our readers who has ever stored honey in a cistern? If there is such a one, let him hold up his hand.

Speaking of a fire-proof reservoir reminds me that more than one bee-keeper has lost his entire crop of honey by fire; and I know of one in particular who recently lost almost all.

THE HICKS WEATHER ALMANAC.

The almanac for 1898 is at hand, and I have given it a pretty thorough study. One of the most preposterous things about it is undertaking to tell what the weather will be all over the United States for one month, on just two pages. As nearly as I can make out, it is done by the *moon;* suppose, however, we say nothing about frost, high winds, etc., and confine ourselves to the prediction of rain. Well, now, when we consider that sometimes it rains like suds in one locality, and does not rain a bit, say only ten miles away, how is Hicks going to help us with his almanac? Our friend below tells us what success he had in trying to make it do so.—A. I. R.

On page 152 you show up the "Rev." Hicks, as he ought to be. A few years ago I bought a copy of his almanac, price 25 cts.: hung it, with a lead-pencil, on a hook in the dining-room. On every day which was rainy, I made a cross on the figure indicating day of month; at end of season there were as many crosses on the light figures as on the heavy ones. There is a fortune in almanacs at 25 cts. each.

Lincoln, Ill., Feb. 24. A. B. NICHOLS.

Perhaps the friends who are perfectly well, especially those who never have any trouble with their digestive apparatus, had better skip this. In fact, you are each and all of you at perfect liberty to stop whenever you feel so inclined. This talk is mainly for those who are among the sick and the suffering — those who have dosed themselves with pills and other drugs in the vain hope of getting relief from their aches and bad feelings. With this preamble I am ready to tell you my story.

I told you something about my seasickness, in our last issue. Well, I was just as sick, or a little more so, coming home ; and while I suffered more or less almost every hour during that trip of 48 hours, I also learned some very valuable lessons, and made some (at least to me) important discoveries. By the way, did it ever occur to you that God teaches us some of our most precious and wholesome lessons through affliction, pain, and suffering? For the first two hours, while the boat was winding among the coral reefs, I enjoyed it very much. Finally, as we approached the great open sea, I asked a passenger what it meant to see so many white sails away off in the horizon, that appeared for an instant and then disappeared.

"White sails? Why, those are not sails; they are the white *breakers*, fully ten miles away, glistening in the afternoon sun."

"Why, do you mean to say that it is going to be rough like that when we get away off out of sight of land when it is so still and quiet here?"

I soon found out he was right. By the time we had covered the ten miles I began to be sick. I braved it for a while, but was finally obliged to remember my little text, "Be still, and know that I am God." In anticipation of similar troubles I had secured an upper berth on deck. I lay down as before, with my head no higher than the rest of my body, opened the port-hole so as to get the breeze, and stayed right there for almost 48 hours. For quite a long period I could not bear even the mention of food. The stewards on the boat were very kind, and came around at each mealtime, even when I did not ring for them, and asked if there was any thing they could bring me, answered my questions pleasantly, advised and suggested in regard to the matter of seasickness. In the hotels, you know, they usually require extra pay where refreshments are sent up to one's room; but on the Trinidad I was told they never think of extra pay, and it is not customary to fee the waiters. When I asked my own particular steward in regard to the matter he said:

"This is our business. We are paid to wait on you, and to make you just as comfortable as we possibly can. This is what we are for."

On one occasion I called for some beef-tea between three and four o'clock in the morning, and it came promptly, nice and hot, and it "hit the spot" too I tell you. Now, then, in regard to my discoveries.

I very soon decided this would afford me an opportunity to compare the lean meat as a diet with one of vegetable and starchy foods. In fact, I heard the passengers discuss the matter, in a group. One man recommended orange juice when one can not take any other nourishment. Some said this, that, and the other. Just one person ventured to recommend a nice beefsteak, without fat or butter; and as soon as I was able to swallow any thing at all, I took the beefsteak and got along very well. Only once did the steak "come up." But I ate it this time, when nature revolted against food of any sort. I forced down the steak to see what effect it would have, and managed to keep it down two or three hours; but when it finally did come up it was just as sweet, fresh, and good, as when I swallowed it. Please remember it had been exposed to the feverish heat of the stomach all this period of time, and not changed in the least. Only one other article of food, and that was not food either, stood the same test. I drank a cup of tea, took it hot, thinking that, perhaps, like hot water, it would do me good. I kept it down about an hour, but it came up just as I drank it. The digestive apparatus had not taken from nor added to it a particle.

Now, it is not very pleasant to tell how other things worked; but I want to do it nevertheless, to demonstrate a valuable scientific fact. When I first got on the steamer at New York it so happened I was unable to get a meal of beefsteak. In fact, I had only time enough to get my last meal, before going aboard, at a lunch-counter. I got a nice piece of chicken and a cream puff. When I became seasick, old father Neptune just had fun with that cream puff. When it came up it was the most bitter, acrid, nauseating concoction that the very spirit of evil could conjure up, as it seemed to me. Orange juice came up converted into a horrible stuff almost as bad; and so with every thing in the line of starch, sugar, or fruits. Plain toast came nearer to the beefsteak than almost any thing else. Tea and coffee were all right providing I refrained from adding the least particle of milk or sugar; and I could hardly make the stewards understand that I wanted my weak tea with *nothing* in it. They would either put in a lump of sugar, or bring three or four lumps, which I always requested them to take right back. If you can get some good soft water, and drink it hot, it is about the best remedy I know of. Of course, it will come up, but let it come. Several rinsings of that sort are a most excellent thing for one with weak digestion.

While at Bermuda, in conversation with Gen. Hastings (whom many of you may remember as a prominent figure in war times), he told me he was almost invariably seasick going to or from New York, and that he always took advantage of it to get his digestive apparatus thoroughly cleansed by drinking water and letting it come up. He said it does not distress one very much after he has "got used to it;" and I was agreeably surprised to

find that I could manage in the same way with weak tea, and not mind it very much.

Now, then, friends, before taking a sea-voyage take at least three or four meals of lean meat, especially avoiding starch, sugar, and fruits of every description. When you begin to get sick, if you can not get rid of it by keeping out in the open air, facing the wind, lie down as I have described, in a clean pure-air berth; and when you can take any thing, take just lean meat, and you will not be nauseated and distressed any thing like as much as if you had been on a fermentable diet. The lean meat absolutely *can not* ferment, like articles of food containing sugar, starch, or even milk.

Now, there is one thing more that I must mention, even at the risk of offending some good friends who may think it hardly fit for public print. Your lean-meat diet will tend to constipation if you are not accustomed to it, and the special thing to avoid is having your bowels overloaded, or loaded at all with the accumulations of several days past. Seasickness will work a remedy, it is true, but it is a very severe remedy, and your suffering may be "long drawn out" before relief comes.

Just before starting for home I had, as I supposed, gotten myself in pretty good condition by the use of hot-water injections (the rubber bags now in common use are very convenient for this purpose when traveling); but I afterward found out that, although hot water had taken away something every morning, there had not been a free and complete evacuation. After 24 hours of acute suffering, in connection with seasickness, another trial of the hot-water injection succeeded to my complete satisfaction. I had abundant evidence of complete deliverance from enough "unpleasantness" to make the healthiest man in the world at least *reasonably* sick; and from that time on, by confining my diet to pure lean beef, and keeping still, I could sing Beulah land, and thank God for life and existence.

Permit me to say here that, when the boat went over the waves, up and down lengthwise, I did not mind it very much; but a large boat like the Trinidad is liable to get to rocking from side to side. The motion is so slow that, unless you get properly braced, you will be apt to roll from one side of your berth to the other. I doubled myself up so as to get my knees against one side, and my back against the other, and in that way I could sleep, and, in fact, I did sleep a great part of my time. A good friend suggests that a hammock, under such circumstances, would give relief, but I did not have an opportunity of trying one. Just before going ashore at New York I ate a beefsteak, and an egg on toast, and soon felt pretty well. Permit me to say that the beef-steak furnished by the boat is of excellent quality—as good as you can get in any of our large cities; and when you are sick it will be brought to your berth at any hour of the day you call for it. If you can not get meat, fresh eggs answer better than most vegetables. Well, I ate my steak about ten o'clock in the morning, before going ashore. My train did not leave New York till five. Before taking the train I went to a restaurant and asked for a beefsteak. They did not serve any for less than 50 cts., and so I told them to bring along a fifty-cent tenderloin steak, thinking I could eat what I wanted of it. The waiter brought a great platter containing enough for a good-sized family. But I was just getting an appetite after my voyage, and I ate it all without much trouble. In fact, I do not know that I *ever* had trouble by overeating good lean beef where nothing else was taken with it. I went on board the train, slept tiptop, and reached Cleveland in time for early breakfast Sunday morning. (Of course, I do not approve of Sunday travel; but where you are on a train with a through ticket, it is not an easy matter to have things just as you would like them.) I stopped at a good hotel, and, feeling unusually well and hungry, I ate a pretty fair *regular* meal. Then I looked up the churches, and by accident fell in with my dear friend and old pastor, W. S. Ament, a missionary from China, who was on his way to preach in a Cleveland church. Of course, I went with him. When his most excellent sermon was about half through, I began to be seasick. You may inquire how I could be seasick while sitting in church. But I tell you I *was* seasick. The church seemed rocking, exactly as if it were on the waves. It would go away up on one side until I almost wondered why the audience did not lean over in their seats, and then go back and roll slowly up the other side. As the church was crowded, and I was near the pulpit, there was no possible way of getting out, so I sat and suffered, and prayed for deliverance. It did not come, however, until I got to my hotel, and got my head down just as I did on the berth in the boat. What did it? I soon found out, without any mistake. While at breakfast I sucked the juice of an orange, and ate a dish of oatmeal and cream, while the waiter was bringing my beefsteak. I was not sufficiently recovered from the effects of the sea-voyage to manage fruit, milk, etc. For supper, you may be sure, I had clear beefsteak once more. By the time I reached home I was able to eat buckwheat cakes and molasses, and things that other people do — that is, provided I took them in moderation. Now, I am well aware that a great part of this is, in substance, a story I have told before Perhaps I should not have made this repetition were it not that new readers are continually asking me questions about the lean-meat method of treating disease. A good many want to know whether I still continue dieting; what I think of lean meat by this time, etc. I have answered you pretty faithfully. Let me give you a little summary (as the experiment stations do) at the close of my story.

If you are able to eat and digest such food as people do generally, all right. You may thank God that you are not obliged to take up the lean-meat diet. If, however, you have trouble with fermentation, sick-headache, etc., such as I have described, then go to work and carefully test the matter, and see if it would not be better for you to pay your money out

at the meat-shop rather than to give it to the druggists or doctors.

It is refreshing to find out, since writing the above, that on two points at least I am backed up by so good an authority as Johnson's Universal Cyclopedia: "With many persons, a mild dose of calomel just before the voyage will prevent a case of seasickness." Again: "Persons who are specially liable may escape by maintaining a horizontal position during the voyage."

The kingdom of heaven is like unto a merchantman seeking goodly pearls, who, when he had found one pearl of great price, went and sold all that he had, and bought it.—MATT. 13:45, 46.

During the past winter quite a number of young people have united with the various churches here in Medina. There has been quite a revival at that new Methodist church I have told you about. Those who subscribed to help pay for the beautiful new building, as a matter of course attended the services. They had some money invested there, and they would naturally wish to attend; and I verily believe some of these have been induced to enlist for life under the banner of Christ Jesus just because they first invested some money in the church *building*. Well, there has also been a revival among the Baptists and Disciples, and, as a natural consequence, a good many of our boys and girls (I call them my own boys and girls, for they have been a long while in my employ) have come out during the past winter for the first time as young Christians. When I asked one of my young friends if he had really enlisted for life, he replied:

"Yes, Mr. Root, I have enlisted for life; and the only thing I feel sorry about is that I did not enlist a long while ago."

Now, then, the point I want to talk about to-day is just this thing of enlisting for *life*. When you hire out to a man you may hire out for a month, for the summer, or perhaps for a whole year; but it is not often that one hires out for *life*. Yes, in one way they do enlist for life, and quite a few of these boys and girls have been enlisting this way. They have some of them got married during the past winter; and if this does not mean enlisting for life, it *ought* to mean so. God forbid that any man or woman, young or old, should think of entering upon the marriage relation without solemnly declaring that it shall be "till death doth us part."

Let us now consider the young Christian again. Some young people do not think it a very sacred and solemn thing to choose Christ Jesus first, last, and always for their helper, their confidant, their nearest and dearest friend. In thinking of those who have united with the church, I felt as though there were some things I should like to say to each and all of them. My dear young friend, let it be really and *truly* enlistment for *life;* and do not let any thing else in this whole wide world crowd it out and get into the background. You can not tell—no one can tell—what a difference it may make in your life whether you hold fast to the strong arm of Him whom even the winds and the waves obeyed, or whether you gradually forget about it, stay away from church, neglect your Bible, so that people may say, "Why, such a one was *once* a church-member." Don't let any thing hinder you from attending the regular Sunday preaching. Then stay to Sunday-school, dinner or no dinner. Why, bless your heart, going without your dinner for an hour is the merest trifle in the world compared with the spiritual bread you will be sure to get in Sunday-school or in the Bible-class. Then do not neglect the weekly prayer-meeting; and above all, read your Bible every day, no matter what happens. If you attend Sunday-school you will find the Sunday-school quarterlies and periodicals contain Bible-readings for every day in the week as sidelights to the lesson. I have greatly enjoyed reading these sidelights in the morning, after breakfast, and that is where I found that beautiful text at the head of this talk, about the "pearl of great price." This merchantman was looking out for good investments; and when he found that one pearl he lost sight of every thing else. In fact, he sold all his goods—all he had in the world—just that he might have sufficient to buy this one pearl; and after he had secured it he never repented of his bargain. In the parable just before our text, we are told a man had a treasure hid in a field. He, too, sold every thing he had to buy that field; and he sold every thing he had joyfully, gladly, yes, *gleefully* he parted with every thing else he had in the whole wide world in order to buy the field that contained that precious treasure. Now you, my friend, have caught a *glimpse* of that treasure—that pearl of great price. Worldly people will hold up other things to you. They will say, "Oh! I would not be everlastingly talking about that one thing. Never mind your prayer-meeting, come along with us, and have some fun. Be like other folks."

At first these invitations will look very reasonable; and, coming from people who seem very nice, and possibly from those who move in what the world would call the "higher circles," we can excuse you, even if you should be at times a little shaken in your faith; but my dear young friend, do not give way. No matter what church you may have united with, your pastor and your Bible will tell you plainly that you can not be a Christian and go to dances, card parties, indulge in wine banquets, big suppers, and all that sort of thing. May God be praised that our lamented Frances Willard was able, through his grace, to inaugurate the custom of turning the wine glass upside down when the starched colored waiter came with his bottle of champagne. Oh, yes, I have seen them do it; but, thank God, I was not *one* of them, Before Frances Willard set the example, the one who refused wine—the

is, in certain circles—was laughed and sneered at. Miss Willard, as I have said, through the grace of God succeeded in making it *fashionable* to turn the glass over, and to give not only the waiter but every one present to understand that she was not afraid to have it known that she belonged to a *total-abstinence* organization. And now the example that she has started is getting clear into the White House, and into the great banquets given among senators and high officers of state. Do not lose sight of that pearl for which you once gave up all. That beautiful old hymn expresses it grandly:

Jesus, I my cross have taken,
All to leave, and follow thee.

I am not yet quite sixty years old, yet I have seen young people start—yes, some of them who had got to be pretty wild and wayward—at a revival meeting; I have seen them turn their backs resolutely against the world of follies that before had been their everyday pleasure, and I have seen them commence to climb from earth to heaven. Christian people always take pleasure in lending a helping hand; and by and by, before they know it, somebody says, "Well, now, that young fellow has really started out to make something of himself," and, acting on the thought, he makes him an offer. Other avenues open. For a time the young convert drops out of sight. He is off at some college. Then people are surprised to learn that he has been offered some high position of trust. The neighbors say, "Why, can it be possible?" Up and up he goes. In serving his Master he has forgotten that he begins to be valuable to the world. He is actually surprised when a call comes that sounds something like that beautiful verse in the 25th chapter of Matthew—"Come, ye blessed of my Father, inherit the kingdom prepared for you from the foundation of the world." Such young men do not often get to be *millionaires*, and may God be praised that they do not; but they do a work that a millionaire *never* did. It is not alone the boys who are taking such tremendous strides, for there are more "Frances Willards" than one in the world just now, but she is not always known by just that name; and this reminds me of a touching little incident I heard repeated yesterday. I think some temperance ladies came over from England. They were addressing some meetings of the W. C. T. U. One of them said in substance, "We love and reverence Queen Victoria, the ruler of England; but we also love and reverence America's *uncrowned* queen, Miss Frances Willard."

Sometimes there is a little discussion as to whether the world is improving in morals, or whether it is going back. If we mix in with one class of people, and hear them talk; if we read one class of newspapers, we might say reasonably that every thing, without question, is going to the dogs. But if we make it a point to visit the schools and the church, hear the reports from mission workers who are now compassing the whole world; if we read the periodicals devoted to demonstrating the Christian religion, we can say that the Bible promises are really being verified; that temperance and purity are going to triumph ultimately. Some people complain, however, that the progress is terribly slow. True, it is slow; but it is because you and I are half-hearted and dilatory; it is because *we* do not help. No one can tell how much influence a single person may have in the matter, and that person may be just yourself. You are to decide. When a young man or young woman breaks away from card parties and these other things, and comes out for Christ, and *holds on*, that person is doing more than human tongue can tell to further God's kingdom and his righteousness. Or, as James says, "He that converteth the sinner from the error of his way shall save a soul from death, and shall hide a multitude of sins."

While these thoughts were in mind, a little bundle of tracts came floating through the mail. I wonder if I hadn't better confess that, when I saw it was just some printed matter, and no money in it (may God forgive me for that last thought), I mean no *business* at all, when the seed business and every thing else are so rushing, I was almost tempted to put it into the waste-basket, without examination; but something said, "No, no! not a thing that is addressed to you or even to The A. I. Root Co., shall be passed by until it is at least reasonably well examined. Even if it is all printed, it may be one of God's messengers, and you may be entertaining an "angel" or casting him aside "unawares." Well, here is what I read on that tract; and wasn't I glad that I didn't throw it away without examination! Here it is:

"UNTO HIM WHO LOVED ME AND GAVE HIMSELF FOR ME."

(May this be *my* aim in all I say and do!)

When you think, when you speak, when you read, when you write,
When you sing, when you walk, when you seek for delight—
To be kept from all evil at home and abroad,
Live always as under the "eye of the Lord."
Whatever you think, both in joy and in woe,
Think nothing you would not like Jesus to know.
Whatever you say, in a whisper or clear,
Say nothing you would not like Jesus to hear.
Whatever you read, though the page may allure,
Read nothing of which you are perfectly sure
Consternation at once would be seen in your look
If God should say solemnly, "Show me that book!"
Whatever you write, in haste or with heed,
Write nothing you would not like Jesus to read.
Whatever you sing, in the midst of your glees,
Sing nothing that God's listening ear could displease.
Wherever you go, never go where you fear
God's question being asked you, "What doest thou here?"
Whatever the pastime in which you engage,
For the cheering of youth, or the solace of age,
Turn away from each pleasure you'd shrink from pursuing,
Were God to look down and say—
"What are you doing?"

Could any thing have been devised to so neatly supplement the words I wanted to say to the new converts throughout our lands? Why, it seems to cover the whole ground so completely, including every thing I would ask a new convert to do, that I could not but thank God again and again for sending it my way. Well, the best part of it is, on just one of the little leaflets I read the following: "To be had free of A. F. Cowles, Toccoa, Ga." You see the dear brother (or sister, I do not know

which it is, and it does not matter) is sending these out *postage paid*, without any hope of benefit in any way except to spread the news of God's kingdom. Well, now, you can do as you choose; but *I* am going to have a hand in helping to furnish postage-stamps for Brother Cowles. Dear reader if you like the little tract; if it commends itself to you as it has to me, send for some of them, and send along at least a little to help pay postage, and then distribute them among your friends. Oh what beautiful Christian men and women we should have if we all followed that rule! For some time back—yes, for many years—when I get hold of a book or paper, as soon as it becomes evident that it is not for godliness and Christ Jesus, I begin to ask myself the question, "Will the dear Savior be pleased to see me reading such a book?" May God bless the words of this little tract, and may he bless the little message from your old friend to the younger ones who have commenced marching under the banner of righteousness, and who have *indeed* enlisted for life. God help you, dear children, to be *not* weary in well doing. Oh! you do not know—you will never know till the time comes—what it is you are *going* to reap if you are only faithful, and hold fast to the start you have made, perhaps in weakness and many trials.

GROWING POTATOES AND ONIONS ON THE ISLAND OF BERMUDA.

While it is no doubt self-evident that we can not adopt the Bermuda plans, at least to any extent, in growing potatoes by the acre or by the hundred acres, I am sure that, where land is quite expensive, say in our little towns, or in the suburbs of our great cities, we can adopt with profit some of their methods. The gardens of Bermuda are little patches, from a few rods square up to an acre, and some of the largest gardens comprise perhaps two or three acres. The largest part of them are from one-fourth to one acre in size. Wherever there is a place between the coral rocks, and enough soil to make a garden, there a garden is located. While the island is pretty well covered with cedar-trees, these and various tropical bushes make excellent windbreaks for the little garden-patches. Besides the protection from the trees and shrubbery, most of the patches are inclosed with stone walls, varying from three to four feet in height to eight or ten feet, or even more. Many of the walls seem to have been built years ago in order to get rid of the stones. Where a piece of ground has only an occasional rock sticking up, these rocks are broken off or sawn off. A horse and plow is seldom or never used on many of the garden-patches; so if they get the rocks away so as not to come above ground, the ground can be worked very well with a fork where one is used to it. The gardens in Bermuda are so similar in many respects to those described by friend Merrill in our little book on growing potatoes in the island of Jersey, that those who have read this book will catch on readily to the situation. Where the piece of ground is large enough, and the rocks do not come near the surface, a horse and plow is often used. The plow is a sort of swivel plow. The horse goes back and forth on one side of the piece of ground, walking in the furrow every time. While this plowing is going on, boys with common garden-rakes put all the trash, weeds, coarse manure, etc., into the furrow. As fast as the furrow is turned, this trash is raked from both sides into the furrow, to be covered up next trip. The consequence is, when they are done plowing the piece is level, soft, and smooth, and ready to plant.

Over half of the population are colored. Slaves were once kept on the island; but England decided it was not quite the thing for a Christian nation, long before we did. I am told these slaves were set free in 1834. They are very industrious, well educated, intelligent-looking, and well dressed; and some of these colored men might well be called "lightning operators" in handling the fork, planting onions — in fact, almost every thing pertaining to their gardening operations.

Before undertaking to plant any crop, the ground is made fine, soft, and light, either with the fork or plow, as I have described. The best test I know of as to whether the ground is in the order it should be, is that you push your arm, without any effort, down nearly to the elbow, or down to the rock if the soil is not deep enough.

When I suggested I could take their horse and swivel plow and plant the potatoes faster, one of the workmen stared at me as if he thought I must be a stranger, and then said:

"I know we can plant ever so much faster by hand. We have tried it again and again."

He was just fixing his strings, so I thought I would wait and see how he worked. When the ground is nice, smooth, and soft, two strings are stretched on one side of the patch. These strings are really good-sized fishlines. They are stiff and hard, so they will not kink readily, and strong enough so they will not break. The potatoes are planted in rows from 20 to 22 inches apart, and from 6 to 9 inches apart in the row. The planter deposits his potatoes in piles, or in pails if he has pails enough, on each side of his piece of ground; then he stretches his two pieces of string, say 20 inches apart. A 20 inch stick lies at each end, to measure by. Then he takes a pail of potatoes, and goes along very much as we do when we are dropping by hand. Instead of dropping them in the furrow, however, as we do, he just plants them by pushing the potato down about four inches. With a flirt of his hand he fills the hole where his hand went down; and this flirt, applied each time, makes a shallow furrow or mark right over the row of potatoes. This serves to tell where they should come up during the first cultivating. After the ground is once made ready for planting, nobody is allowed to step on it. Even

the dogs are taught to run around the garden-patches instead of tramping over things.

The planter sets two stakes when he starts out, the right distance apart, with his marking-stick. Then he goes to the further end and sets two more, drawing the two lines up tight. After he has planted through on the one line, he moves one stake. This throws it across the line, X fashion. When he gets planted through on the second line he moves the first stake over, making the X in two parallel lines just as when he started. If his garden-patch is irregular in boundary, as it usually is, he rolls up his lines, or unrolls, as the case may be, to make the length of the line to suit the width of the patch.

not oftener. A good deal of the fertilizer is sprinkled over the ground at the time of cultivating. The cultivating is done as soon as the potatoes begin to show themselves above the ground. It is done with a potato-fork. The operator goes down almost if not quite as deep as the potatoes are planted. He walks backward, so that the ground is once more lightened and fined up. With a flirt of his fork he stirs every particle of dirt clear around the young plant.

The first crop grown in the winter time, of Triumphs, never blossoms. The potatoes are cut to one eye, on Terry's plan; and they like to have the potatoes sprouted enough so there will be no mistake about having a plant wher-

A BERMUDA POTATO-FIELD.

Please notice how completely the potato-tops cover the ground, coming up knee-high, or possibly more, to the man standing in the field. In the background you will catch glimpses of the native cedar-trees; and you can see how they have pushed their garden clear up among the rocks and bushes.

This is very close planting, as you will notice; and the Triumph potato, which is almost the only one used on the island at the present time, is very often planted in rows 20 inches apart, and 6 inches apart in the row. In order to get a crop, crowded like this, the ground must be made exceedingly rich, either with stable manure or with chemical fertilizers. One of the finest gardens I saw on the island was where they used Bowker's "complete manure" (costing about $40.00 per ton, I think) at the rate of one ton per acre; and this heavy manuring is put on as often as once a year, if ever a piece is put in. In Bermuda the rainfall averages 60 inches in a year; and 40 of the 60 inches comes in the night. Their soil is so porous, being composed mostly of pulverized coral rock, that the water goes right down through. Even where a garden is right down in a hollow between the hills, with no outlet, there is never any injury from standing water; and yet there is no underdraining nor ditching ever done in the Bermuda gardens. The consequence is, the soil is always soft. It never becomes soggy, and never bakes, as most of our soils do. On account of this

abundance of moisture there is no objection to sharp hilling up. When I talked level culture, they said the plants must be hilled up or else the winds would twist them off. They are hilled clear up to the leaves. Hilling up is done with a hoe. They usually hill up one side, and wait a few days and then do the other.

About two weeks before digging-time, more potatoes are planted in the bottom of the furrow, right between the rows. These are just coming through the ground when it is time to dig. The boy who digs the potatoes throws them out with a pronged potato-hoe, and in doing so throws the nice soft mulch among the younger plants just coming up. In this way you see this expensive, highly fertilized soil always contains a growing crop; and this is kept going on right along until three and sometimes four crops of potatoes have been grown continuously right on the same ground.

The potato-bug has never yet crossed over to Bermuda. They do have the blight, however, greatly to their sorrow. I told them they ought to be quite happy so long as they had no bugs and blight both, as we have. There is a difference of opinion in regard to the value of spraying with the Bordeaux mixture to prevent blight. Some declare it is a perfect remedy, if put on in time. Others say it sometimes *seems* to keep off the blight, and then again it doesn't. Many patches that have been sprayed quite thoroughly were badly injured by the blight. Others feel sure the spraying had kept the blight away; but as there were, occasionally, patches that did not have blight at all, even when no spraying was done, you see the matter is considerably in the dark.

The Bermuda potatoes are celebrated almost the world over for their excellent quality. The soil is so light that the tubers are never squeezed out of shape. When first thrown out of the ground they are as handsome, clean, and smooth, as a lot of fruit. No wonder, for they have room to grow and expand in every direction without any thing to mar or squeeze them. When I remarked that we did not consider the Triumph a first-class potato in the States, my companion, Mr. Morrison, said we would have some for dinner. They were boiled with the skins on. They not only burst the skins open, and showed their rich contents almost as white as snow, but were so dry and mealy that I was prepared to acknowledge they were the finest potatoes I ever ate anywhere. But we had been having a pretty good wheelride that morning, and Mrs. Root declares I call every thing the "best in the world" after a wheelride.

The Bermuda gardeners said if I would give them a potato that would not blight it would do them more good than any thing else in the world. It must be a red potato, for some way or other the red color has become a trade-mark of the Bermuda potato. The Garnet Chile is grown a little later in the season, but not as many of them as of the Triumph. Minnesota Red and Early Rose used to be standards, but they got so they did not yield very well.

One large source of manure for their gardens is seaweed. This is also mentioned in our book about growing potatoes on the island of Jersey. I presume it is the same thing that the sea washes up on shore all around the island. I think it is supposed to float on the sea from the Canary Islands, and I think some of the salts of iodine are found in the ash. A load of this seaweed, just as it is gathered where it is washed up, is thought to be worth as much as a load of stable manure.

With this close planting, very likely our Bermuda friends do not get the great yields we sometimes get here in the States, per acre —that is, for one crop; but when they get three crops, one right after the other, and get from six to eight dollars a barrel, you see it counts up. Their potatoes are marketed in New York at a season of the year when new potatoes are a rarity, and their reputation for excellence in quality helps to bring a big price. Just as soon as I can work some of my creek-bottom ground I am going to try Bermuda potato-growing. It will be just the thing for my test-grounds for the different varieties of early potatoes. I would particularly emphasize having the ground soft and loose and deep, and keeping it so during the whole growth of the patch. Not only keep the horses from tramping it, but do not tramp it yourself more than is necessary to cultivate it in the manner I have described. The various hand cultivators have been tried in Bermuda, but they claim they can get along almost as fast with the fork, and do the work ever so much better. I suspect this method of cultivating is pursued in many other foreign countries, for I have seen my German and English gardeners handle the fork very much in the way these Bermudans do.

Our good friend Terry has been severely criticised, and sometimes by our experiment stations, because he constantly declares he wants only one potato-stalk in a hill, and hence his cutting to one eye The Bermuda people have been practicing this for at least a hundred years. Their potatoes, when the blight does not bother them, are almost all marketable. Many of them will be the size and very much the shape of a common base-ball—rarely larger.

Now, friends, you who have gardens in towns where land is worth several hundred dollars an acre, get to work and see if you can not grow potatoes Bermuda fashion. While you are about it you want to plant some onion seed, and have a good lot of plants ready, and in our next I will tell you about growing onions Bermuda fashion.

GARDENING IN THE MIDDLE OF MARCH, 1898.

We are just now having one of our pleasant surprises—at least it is pleasant to me. It is a mild spell of weather, without even a bit of frost nights, right in the middle of March. The doors and windows are open, and have been for several days. It affords us a grand opportunity to start our cold-frames and to get in seeds and plants. But when the frosts come again, as I presume of course they will, we shall have a hustling time to get every thing covered. I got a carpenter to help the boys,

and we have been busy making the beds *tight*. The frosts we have are pretty sure to pull to pieces the beds, especially around the corners and joints; and if you want your stuff to stand severe late freezes, you want your beds snug and close. A cold-frame made of inch boards for the sides, covered with a close well-fitting sash, will keep out almost any frost after the middle of March. But there must be no cracks nor crevices of any sort. The sash must lie down tight on the smooth level surface of the boards that inclose the bed. The corners must be nailed up snug and tight; all cracks and knot-holes must be well battened. Our beds where we put on tarred paper, and then common shingles over the tarred paper, are very efficient in keeping out frost. There must be no broken glass. One hole in a sash will let in frost enough to kill the plants for several feet around it. We never use any mats or outer covering, and very seldom a shutter over the sashes. And, by the way, shutters will do very well now in place of glass sash; but you must pull them off so as to give the plants light whenever the weather is above freezing.

Our crimson clover has once more wintered beautifully. In fact, on the ground where it shelled out and seeded itself last summer there is a heavy green sod of crimson clover. I do not know what it will do when it comes to blossoming, having so many plants crowded so closely together. With me it is no longer an experiment, wintering over crimson clover. On our thoroughly underdrained rich clay soil, if the seed is put in in July or August, and the work is done properly, I am sure there is hardly a chance for failure. We are going to plow it under for potatoes when it is in full bloom, or perhaps when well on toward seed. The seed is offered so low now that I think it is worth more as a fertilizer than to sell in the market.

You might think we have had no weather to throw things out; but the strawberry-plants that were not mulched have been thrown out by the frost badly, especially the potted plants in the jadoo fiber. Those we put in late, some of them came clear up on top of the ground—jadoo fiber, bushy roots, and all; but before they had sustained any injury we discovered it and pushed them back into the ground again where they belong. Of course, the next frost may hoist them out again. That will depend on the weather. But the plants that are set in the jadoo fiber should be planted out early enough in the season so the roots can get out and get a firm hold in the clay soil, or else they should be thoroughly mulched. We did not mulch our plantation where we put the plants two feet apart from center to center, because I wanted to give them good cultivation right along; and, in fact, we have gone over them once with a hand cultivator already this 11th day of March. Of course, at this close distance runners must be kept off as fast as they make their appearance. The plants put out in August or September almost all hold their places, or at least have so far. It was those planted in October or later that came out on top. Our strawberry-plants put out in beds that had a little steam heat are growing just beautifully; and the "Earliest" is full of buds and blossoms. Where they were kept still warmer there is green fruit already. We have branches of drain tile that carry our exhaust steam quite long distances; the amount of heat gradually grows less and less as the length of the tiles gets away from the main branch that carries the exhaust steam. In this way we have beds containing all degrees of exhaust steam heat, from so much as to be too warm for most plants, clear down to where the heat imperceptibly fades away into nothing at all. Strawberries, onions, and such like hardy stuff do best with just a little bottom heat.

GOOD ROADS AND WIDE WAGON-TIRES.

Our friends will notice an advertisement of metal wheels, now running in our journal. From the Electric Wheel Co.'s catalog we clip the following:

Elaborate tests of the draft of wide and narrow tired wagons have just been completed by the Missouri Agricultural College Experiment Station, Columbia, extending over a period of a year and a half. These tests have been made on macadam, gravel, and dirt roads in all conditions, and also on the meadows and plowed fields of the experiment farm. Contrary to public expectation, in nearly all cases draft was materially lighter when tires six inches wide were used than with tires of standard width. The load hauled was in all cases the same, and the draft was most carefully determined by means of a self-recording dynamometer. The beneficial effect of the wide tire on dirt roads is strikingly shown in some recent tests at the station. A clay road, badly cut into ruts by the narrow tires, was selected for the test, as presenting conditions least favorable to the broad tire. A number of tests of the draft of the narrow tire were made in these open ruts, and immediately followed by the broad tires running in the same ruts. The first run of the broad tires over the narrow ruts was accompanied by an increased draft; the second by a draft materially less than the original narrow tire; third by a still greater decline, and in the fourth trip the rut was practically obliterated and filled. In another trial, when a clay road was so badly cut into ruts as to be almost impassable for light vehicles and pleasure-carriages, after running the six inch tires over this road twelve times the ruts were completely filled and a first-class bicycle-path made.

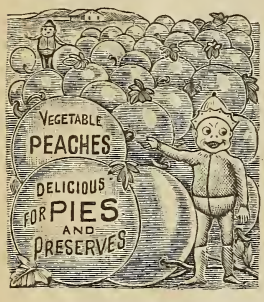
For several years I have been talking about getting a set of steel wheels for our heavy farmwork. To get a wheel as strong as our wooden ones, we found they would have to be very much heavier; and our teamsters objected, because they would have a heavier wagon to draw around when the roads are hard and solid. They also declared the wagon would pull harder when the roads are soft and everybody else uses narrow wheels. The reports from the Missouri Experiment Station, of which the extract above is a summary, seems to indicate that there are very few conditions under which the draft is harder on the team, and their experiments were made with a self-recording dynamometer, which seems as if it must be conclusive. There is another objection: The wide steel wheels are much smaller in diameter, and it takes more power to run over small stones or other obstructions, or over a rough road, with a small truck-wheel than with a large wheel. The dynamometer, however, declares, notwithstanding this, that the load pulled easier with the wide tires.

I can say from practical experience that the

wide tires are a great blessing to the cyclist. In making long distances I have frequently followed in the track of a wide-tired wagon-wheel for miles; and it really made me feel bad when the vehicle turned into the barn-yard of some progressive farmer, for then my wheel-track was gone. We have wide tires on our manure-spreader, and we also have steel wheels on some of our Eclipse and other implements. My experience is that the steel wheel, even though it is heavier than the wooden one, gets banged out of shape easier than the latter, for I believe it is laid down in mechanics that a pound of hickory or oak will stand more hard knocks than a pound of steel—that is, under certain conditions; and the spokes and felloe of a wagon-wheel, it seems to me, constitute one of those conditions. You see I am not writing a puff for our advertisers; but I do want to get at the truth of the matter. I wish our farming friends who have the new wide-tired steel wheels would report. It has been suggested that we could have two sets of wheels, and swap them according to the weather or season. I would rather have two wagons; then I could tell pretty soon which one was the easier for the team.

Vegetable Peaches.

This vegetable wonder is a most delicious fruit, size, shape, and color of an orange, thoroughly tested, succeeds everywhere, and matures from the seed in 80 days from planting. Flesh beautiful snow white, tender and melting; far superior to citron for preserves; excellent fried same as egg-plant; nice for slicing, and for mangoes and sweet pickles have no equal. Many consider them even better than peaches for pies, etc., as they possess a fine, tart, spicy flavor.



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SPECIAL OFFER. A large packet of Giant Pansies—over 50 beautiful colors and shades, (worth 20c)—added free if you order promptly, and name this paper.

Address A. T. COOK, (Seedsman), Hyde Park, N. Y.

PEACH-TREES. 4 to 6 ft. at 2c; 3 to 4 ft. at 1½c; all one year from bud; healthy and thrifty; no scale. Official certificate accompanies each shipment. Sample by express if wanted. Can ship any time Trees kept dormant till May 10. R. S. JOHNSTON, Box 43, Stockley, Del.

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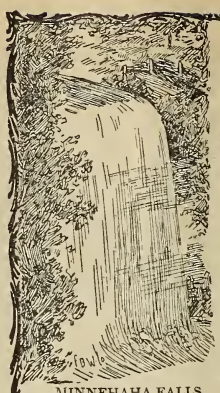
W. E. YODER, Lewisburg, Union Co., Pa.



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